CHANGETRON 2™

SET-UP INSTRUCTIONS

READ THESE INSTRUCTIONS
BEFORE PLACING THE CHANGER
ON LOCATION

SAVE FOR FUTURE REFERENCE

CRANE

NATIONAL VENDORS
12955 Enterprise Way
Bridgeton, MO 63044

Part No. 5002480

C D E F G H I J K L M N O P Q R S T U V W X Y Z

WARRANTY

The Changetron 2™ Currency Changer is warranted for one (1) year against defective parts and workmanship. Any part or parts, which are proved to be defective within one (1) year of the date of shipment, will be repaired or replaced free of charge when the defective part is returned with the transportation charges prepaid to the destination designated by the National Vendors' Parts Department.

This warranty applies only to the original purchaser of the Changer and is null and void if the Changer is sold during the period of warranty.

This warranty is also null and void for all electrical components, wiring, or circuits, and/or for all mechanical parts or assemblies damaged as a result of operating the Changer at other than 110-120 volts, 60 Hertz current.

No warranty is given or implied on incandescent lamps, neon lamps, fluorescent lamps, ballasts, starters, and other expendable items.

Further, National Vendors is not responsible for any costs of service rendered, or repairs made, at other than National Vendors, or by anyone other than an authorized factory service representative of National Vendors, unless authorization to incur such expense has been given in writing by National Vendors prior to the incurring of such expense.

This warranty is in lieu of all other warranties expressed or implied, including, without limitation, warranties of merchantability, and all other obligations or liabilities on National Vendors' part; and National Vendors neither assumes nor authorizes any person to assume for it, any other obligation or liability in connection with the sale of said equipment or any part thereof.

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Bridgeton, MO 63044

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SPECIFICATIONS

SIZE: Height - 72" (182.9 cm) with Base
43 3/4" (111.1 cm) without Base

Width - 10" (25 cm)

Depth - 15-1/4" (38.6 cm)

WEIGHT: 112 lbs. (50.8 kg) - Changer only
23 lbs. (10.4 kg) - Base only

POWER REQUIREMENTS: 120 Volts A.C.
60 Hertz - Single Phase
3 Amps

U.S. CURRENCY: Nickels, Dimes, Quarters, $1 Bills, $5 Bills (bill acceptance varies, depending upon the Bill Validator)

DRUM CAPACITIES:

U.S. Coins

Nickels	2200	($ 110)
Dimes	3000	($ 300)
Quarters	1800	($ 450)
SBA $1	1300	($1300)

Tokens

"A" (.882")	(Use 25¢ Tube)
"B" (.900")	(Use 25¢ Tube)
"C" (.987")	(Use $ Tube)
"D" (1.000")	(Use $ Tube)

STACKER CAPACITY: 1600 Bills

COIN MECH: Optional

SECTION I
GENERAL INFORMATION AND INSTALLATION

I. INTRODUCTION

The CHANGETRON 2™ Bulk Load Currency Changer dispenses coins and/or tokens for validated U.S. bills and coins. Payout values and quantities are independently programmable for each of the two payout drums. Standard components described below are shown in Figure 1-1 and Figure 1-2.

Indicator Lights

The white "READY" light is on whenever the Changer is operational. This light will go off and the red "TEMPORARILY OUT OF SERVICE" light will come on when sufficient change is not available for the largest programmed payout. The "READY" light will also go off should a problem occur with the bill stacker, coin rejector, payouts, or the electronic control module. When the "READY" light is off, bills and coins are not accepted.

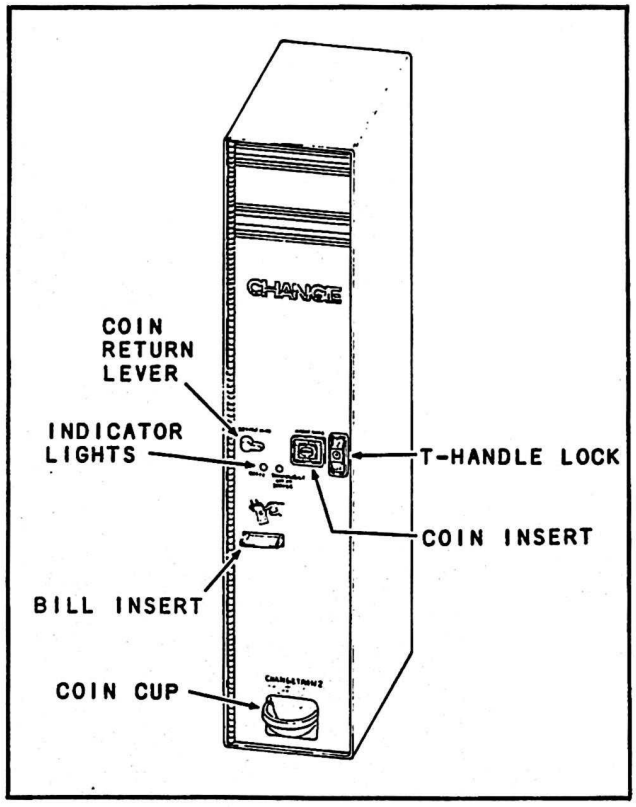


Figure 1-1. CHANGETRON 2™ Front View

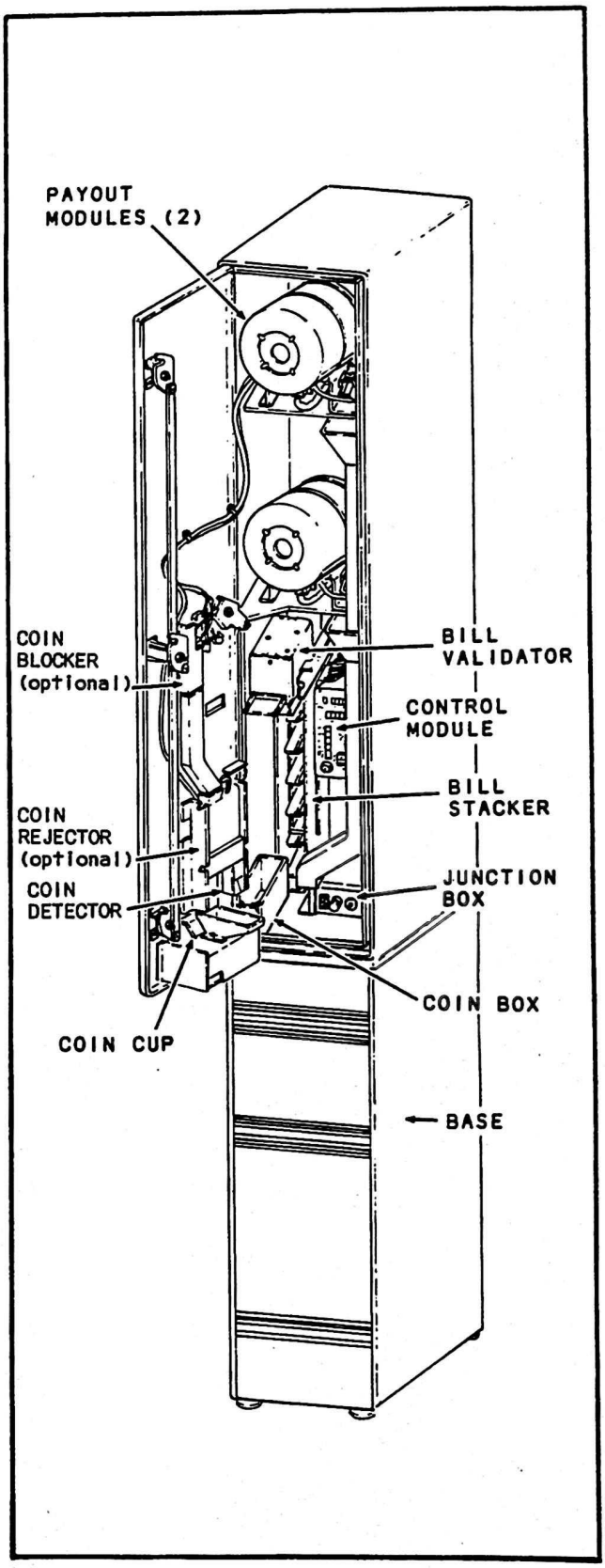


Figure 1-2. CHANGETRON 2™ With Cabinet Base

Junction Box

The junction box is located inside the Changer. It contains the power on/off switch, a resettable circuit breaker, the control module protective fuse, the 120/24 VAC power transformer, and a high frequency (EMI) filter. The power cord, routed through the backside of the Changer, has a standard 15 amp 3-prong plug.

Control Module

The control module monitors and controls all operations of the CHANGETRON 2™ Currency Changer. It contains a single-chip microcomputer, a nine-digit display, push button programming operating switches, and a supervisor's key switch to lockout the program function. A selector switch is also provided to change from regular payouts to bonus payouts without reprogramming. A brief description of the pushbutton switches is as follows. Diagnostic functions are described in Section IV (see TROUBLESHOOTING).

PROGRAM - enables programming the drum values and payout combinations.

TEST - enables testing the display, bill stacker, payouts, and diagnostics.

DATA - enables data retrieval and clearing all resettable data counters.

RETURN TO READY - enables currency acceptance and clears the display.

FILL TUBES - enables refilling of tubes after change has been emptied.

STACK - used to test the bill stacker (Test Mode), to program Drum A (Program Mode), and to empty Tube A (Ready Mode).

$1 - used to test the $1 payout (Test Mode), to program Drum B (Program Mode), and to empty Tube B (Ready Mode).

$5 - used to test the $5 payout (Test Mode).

$10 - used to test the $10 payout (Test Mode). Twenty coins payout for each drum, maximum programable limit. Requires $10 Validator. For future use.

Bill Validator

National Vendor's bill validator is the industry standard for high security bill validation. Bills inserted into the validator are magnetically scanned for proper ink content and precise printed patterns. The drive motor automatically reverses to reject bills which fail to satisfy the programmed time sequences or when scannning signals are not verified by the validator's logic board. The bill validator is automatically disabled (no bills accepted) when the drive motor runs longer than normal or when the control module (diagnostics) has detected a problem with any of the changer's functions.

Bill Stacker

The bill stacker receives and stacks all bills verified by the bill validator. An integral mounting bracket ensures proper alignment of the validator with the stacker.

Coin Rejector & Detector

The coin rejector accepts U.S. nickels, dimes, and quarters. Foreign currency and bogus coins are automatically returned to the customer. Bent or jammed coins are also returned to the customer when the coin return lever is used.

Valid coins are routed to the coin box through the coin detector an electronic sensor which signals the control module to credit and total each coin denomination accepted. The solenoid-operated coin blocker closes the coin insert during tube inventory, programming, data retrieval, tube refill, and self-diagnostics.

Payout Module

The payout module consists of a universal drum, motor base, and payout tube assembly. Drum positions are identified for programming as A (upper) and B (lower). Interchangeable payout tubes are color coded as follows: gray (nickels), red (dimes), blue (quarters, .882" and .900" tokens), and yellow ($1 coins, .987" and 1.000" tokens). Drum inserts are required for dime payouts. See Section III for details.

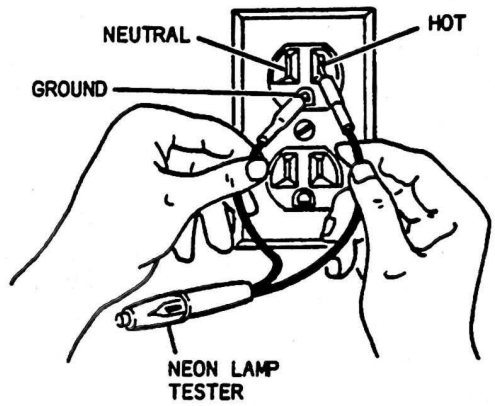
II. UNPACKING AND INSPECTING

Check to see that the equipment model and part numbers agree with the shipping invoice or freight bill. Inspect the equipment immediately. If any discrepancy or shipping damage is detected, save all packing materials and file appropriate claim with the carrier. Read all instructions thoroughly before installing, operating, or servicing the Currency Changer. Use original or equivalent packing materials when reshipping the equipment.

III. INSTALLATION

A. Select the appropriate mounting location and check the designated wall receptacle for proper voltage and grounding (see Figure 1-3). New wiring must comply with the applicable electrical codes having jurisdiction.

B. If the Changetron 2™ is to be permanently mounted, it will be necessary to change to rigid conduit to meet U.L. requirements. (see Figure 1-4)



To Test Wall Receptacle For Proper Grounding

On a three-slot receptacle, insert one test probe into the semi-circular ground slot and the other test probe into each of the elongated slots. Receptacle is properly grounded when test lamp lights (or voltmeter reads voltage) with test probes in the hot and ground slots.

Figure 1-3. Testing Wall Receptacle

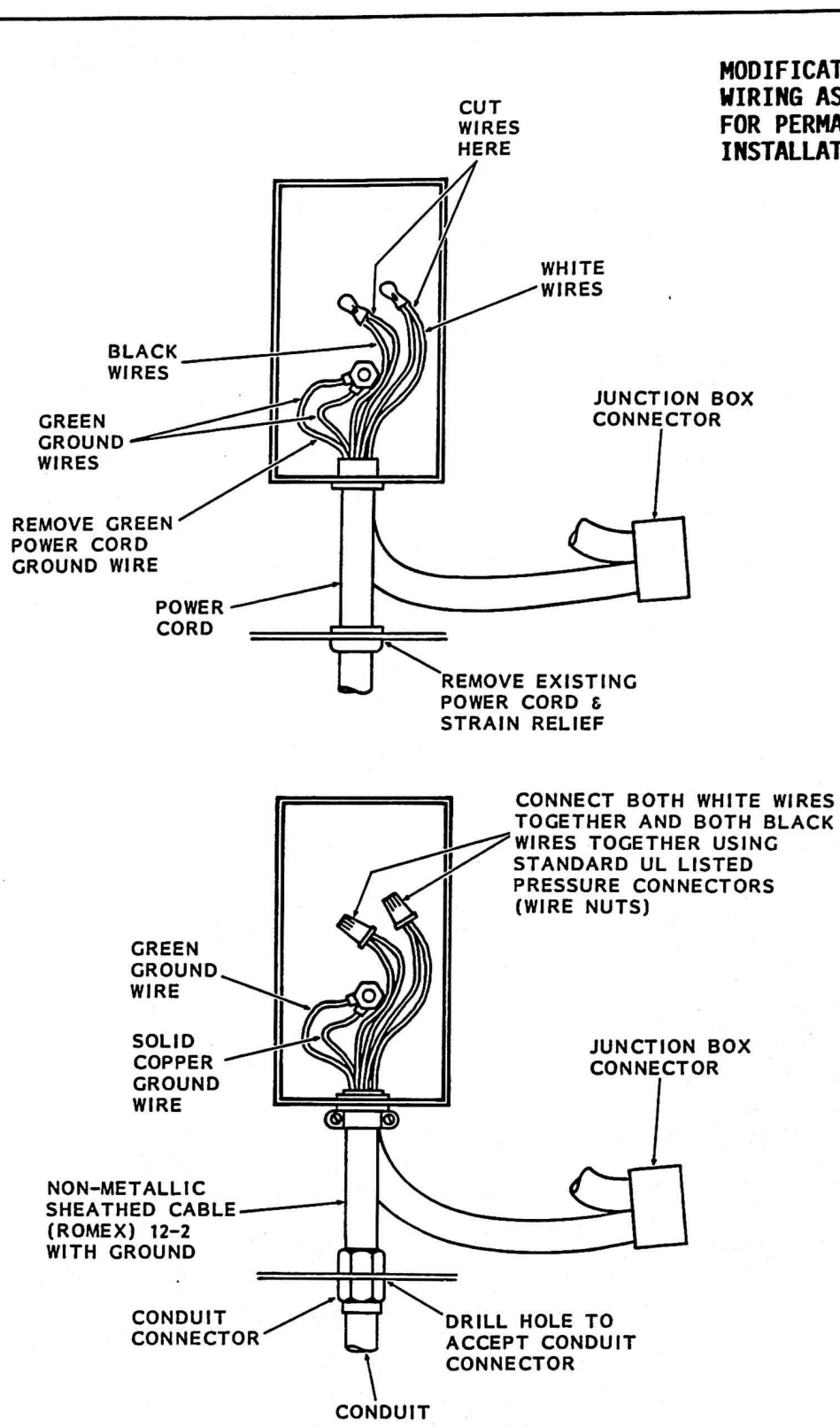

MODIFICATION OF WIRING AS RECEIVED FOR PERMANENT INSTALLATION
CUT WIRES HERE
WHITE WIRES
BLACK WIRES
GREEN GROUND WIRES
JUNCTION BOX CONNECTOR
REMOVE GREEN POWER CORD GROUND WIRE
POWER CORD
REMOVE EXISTING POWER CORD & STRAIN RELIEF
CONNECT BOTH WHITE WIRES TOGETHER AND BOTH BLACK WIRES TOGETHER USING STANDARD UL LISTED PRESSURE CONNECTORS (WIRE NUTS)
GREEN GROUND WIRE
SOLID COPPER GROUND WIRE
JUNCTION BOX CONNECTOR
NON-METALLIC SHEATHED CABLE (ROMEX) 12-2 WITH GROUND
CONDUIT CONNECTOR
DRILL HOLE TO ACCEPT CONDUIT CONNECTOR
CONDUIT

Figure 1-4. Wiring Installation

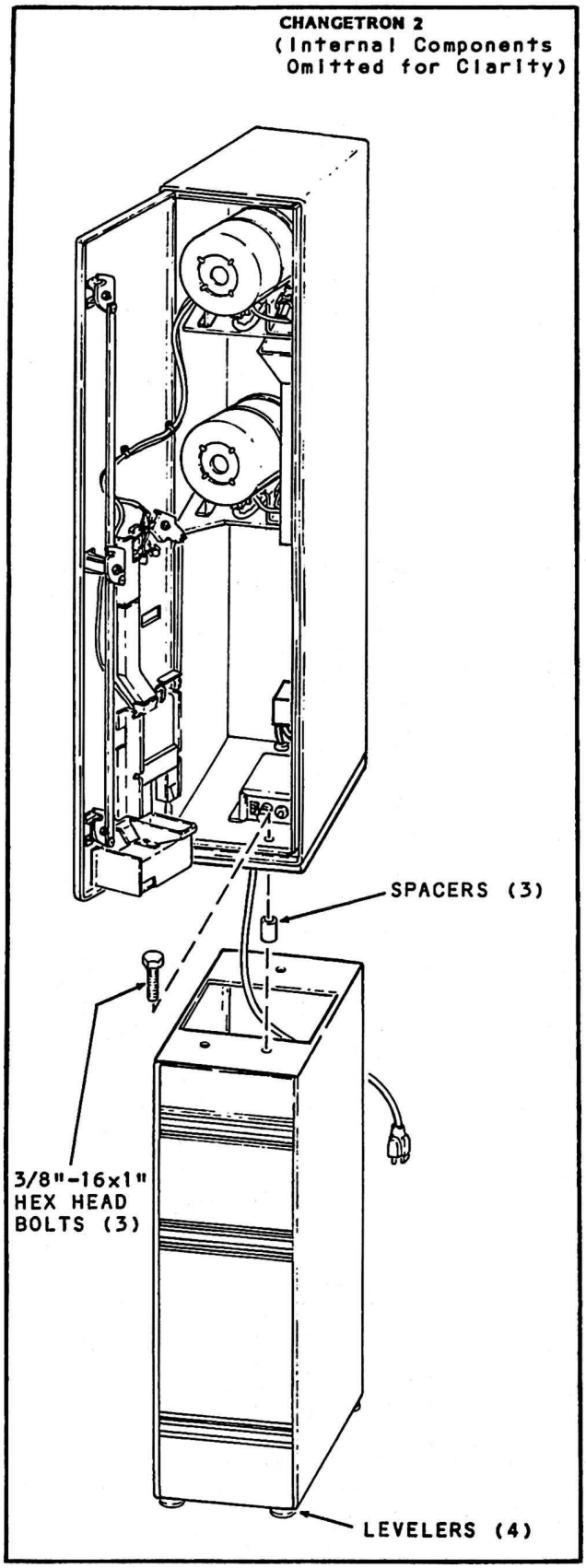


Figure 1-5. Mounting The Changer to the Base

C. Install the changer and cabinet base as follows (see Figure 1-5).

NOTE

The CHANGETRON 2™ Currency Changer is designed to rest on flat, level surfaces without damage to the power cord. However, when routing the power cord elevate the changer slightly to clear cord as shown. Or, route the power cord directly from the changer to the wall receptacle.

1. Position the cabinet base in the desired location and adjust the levelers as needed. Check horizontal and vertical alignment with a spirit level.

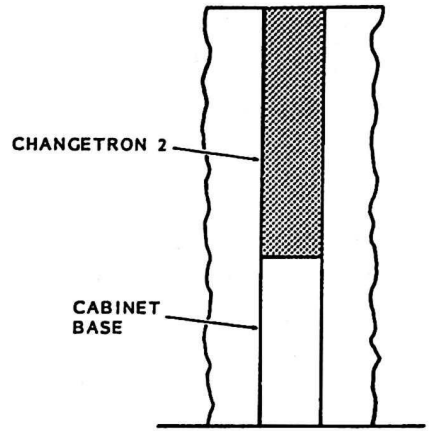
2. Route the power cord as the installation requires. Set the Changer on the base, align the three mounting holes and spacers.

3. Insert the three mounting bolts and tighten securely.

WARNING

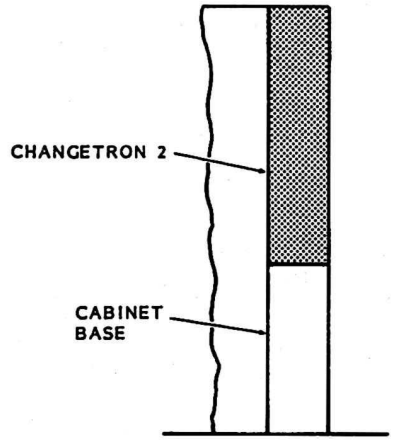
The CHANGETRON 2™ is not a free standing Unit and must be fastened to a wall or other supporting surface. (see Figure 1-6)

D. Install the T-Handle lock cylinder provided with the Changer. See Figure 1-7.



1. MOUNTING BETWEEN TWO SURFACES
Use four bolts through each side of the Changetron 2. See sheet 2 of 2 (left & right side views)

The Cabinet Base, if used, will fill the space below the Changetron 2 and provide a matching surface on which the console can be mounted. The space can also be filled with a matching filler panel. (e.g. vinyl covered plywood, etc.)

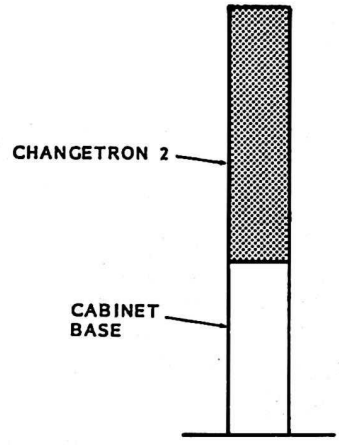


2. MOUNTING FROM EITHER SIDE (left side shown)
Use four bolts through one side of the Changetron 2. See sheet 2 of 2 (left side view). If mounted on the left side, allow enough room to fully open the cabinet door.

Use two bolts through the cabinet base.

NOTE

Before drilling holes in the left side and rear of the Changetron, remove the Validator and stack.



3. MOUNTING FROM REAR
Use two bolts through the rear wall of the Changetron 2 and the Cabinet Base. See sheet 2 of 2.

Figure 1-6. Mounting Instructions (1 of 2)

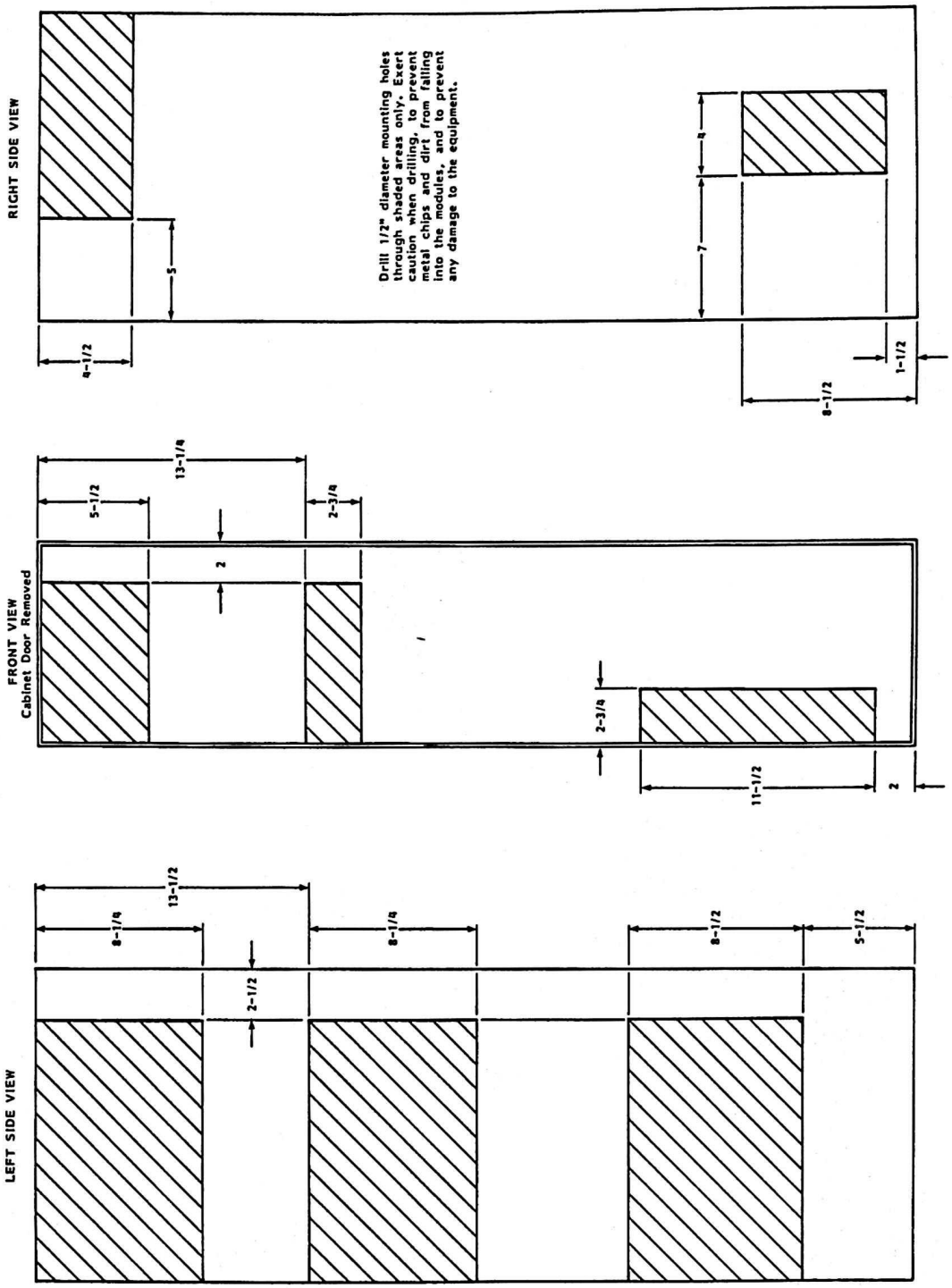


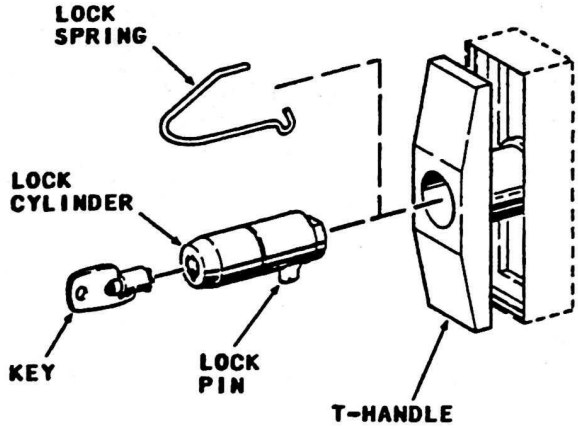
Figure 1-6. Mounting Instructions (2 of 2)

5002480

INSTALLATION OF THE DEAD-BOLT LOCK CYLINDER (*Part No. 5263897) FOR UNITS EQUIPPED WITH THE T-HANDLE LOCK

To Install The Lock Cylinder:

1. Remove the Lock Spring from the T-Handle (as shown).
2. Insert the Key into the Lock Cylinder and turn Clockwise to lower the Dead Bolt Lock Pin to its spring return position.
3. Depress the Lock Pin and push the Lock Cylinder into the T-Handle until the pin snaps into the square hole. Rotate the Lock Cylinder as needed to ensure proper pin engagement.
4. Test the Lock Mechanism and place the Keys in a secure location. Record the Lock Cylinder Number for future reference.



*Includes two keys.

Figure 1-7. Installing The T-Handle Lock Cylinder

SECTION II
UNIT PREPARATION

I. LOADING THE DRUM

A. Check color of the coin tubes to ensure that each tube is the correct size for the coin or token to be used. Refer to SECTION III for removing and replacing tubes and drums and tube color codes.

B. Sort coins and tokens into separate cloth bags. To ensure an accurate inventory, record the quantities by denomination (or size) before loading the change drums. Refer to the unit specifications for drum capacities.

IMPORTANT

Do not overload any of the change drums. Excessive loads can cause the drum motor to stall resulting in reduced tube fill rates or power shutoff due to thermal overload.

C. Leave the change drums installed and remove the drum lids. Rotate each drum clockwise to ensure the drum base pin is engaged with the motor coupling (see Figure 2-1), and the coin window is on top at the 12 o'clock or 1 o'clock position.

D. Insert the coin bag opening well inside the drum and gently pour out the contents. Slowly remove the bag and verify that all coins or tokens were emptied.

E. Snap the lids back on all drums to prevent spillage during the coin tube fill cycles.

II. FILLING THE COIN TUBES

Coin tubes are automatically filled when the drums are loaded, the power cord is plugged in and the power switch is set to "ON" and the FILL TUBES button is pressed. Each drum motor will run for a maximum of eight cycles (8 seconds on and 1 second off each cycle).

During the tube fill cycles, the TEMPORARILY OUT OF SERVICE light will come on. The READY light will come on and the drum motors will stop once the tubes are filled with enough coins or tokens to hold down the tube empty sensor lever.

IMPORTANT

To fill the coin tubes after refilling the change drums or emptying the tubes, press FILL TUBES button on the control module. The Changer will not operate (READY light off- diagnostic display flashing) if the coin tubes required to make change are not refilled.

III. PROGRAMMING THE CONTROL MODULE

A. Turn power on and fill the coin tubes, if not previously done - see part II.

B. Unlock the control switch (see Figure 2-2). Insert the supervisor's key and turn clockwise. After completing the following program procedures, return the control switch to the locked position and remove the key for safe keeping.

C. Press and hold PROGRAM button (approx. four seconds) until "1" appears in the display mode window.

D. Press the horizontal Operator buttons one at a time to program the desired drum value for position A and B. Enter "05", "10", etc. for coins or "t" for

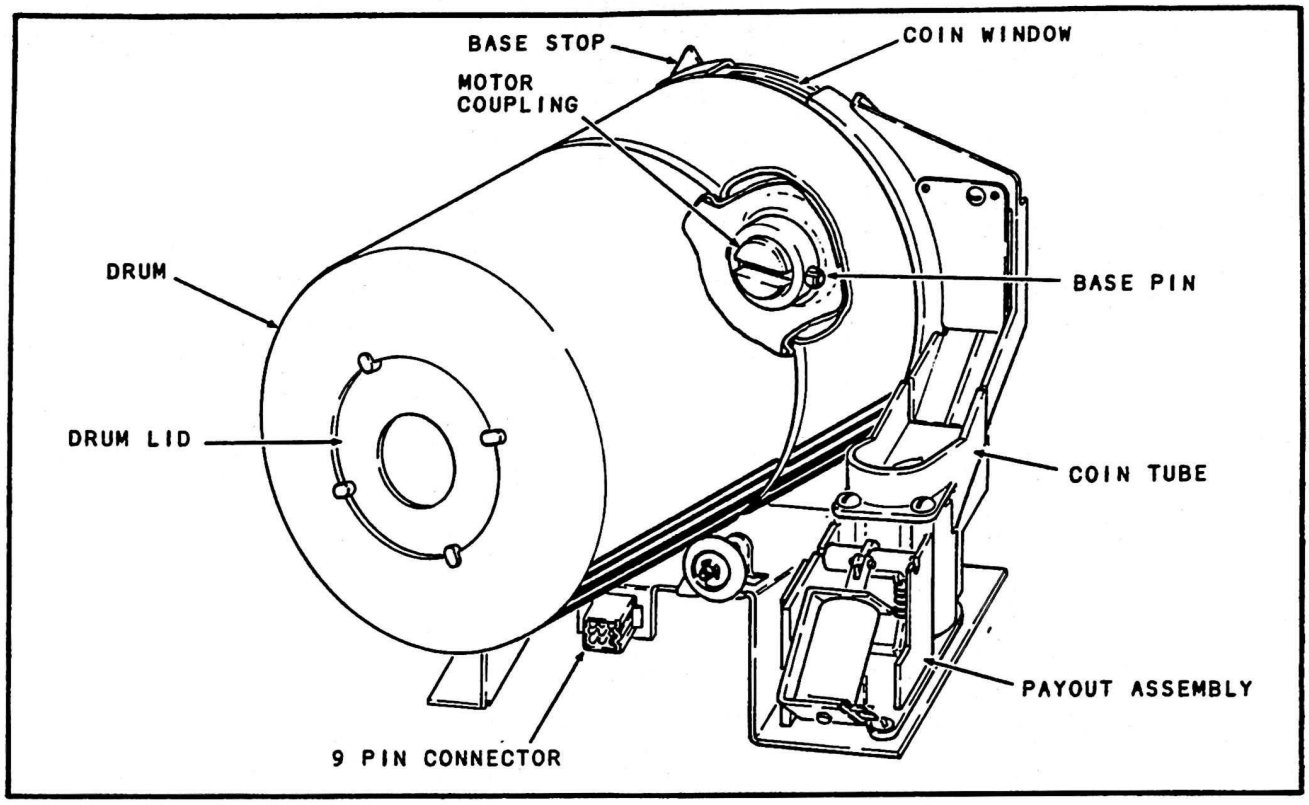


Figure 2-1. CHANGETRON 2™ Payout Module

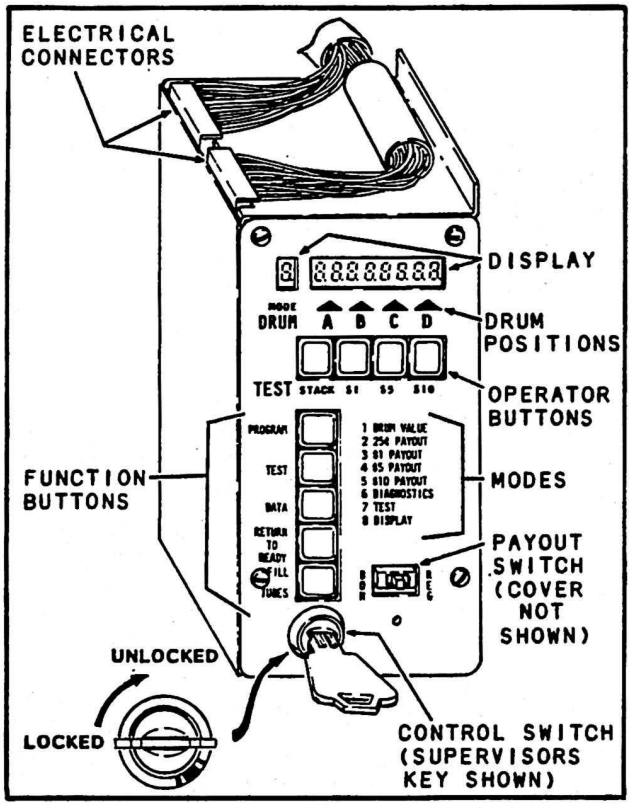


Figure 2-2. CHANGETRON 2™ Control Module

tokens. The display readout advances in 5 cent increments from "oo" to "t", then rolls over to "oo" (see note below).

Example: For a quarter-dime drum arrangement (where A = 25¢ and B = 10¢, press horizontal buttons until the display reads (25.10.) (C and D not used)

NOTE

Enter "oo" in all program modes (1-5) for any change drum not intended for use. After completing all programs, disconnect the 9-pin connector (see Figure 2-1) at the unused payout module.

E. Press PROGRAM to advance to Mode 2 - "2" should appear in the display mode window.

F. Again using the horizontal operator buttons, program the desired 25¢ payout for drums A and B. Enter "01", "02", etc. for the number of coins or tokens to be paid out from each change drum - display readout advances in single increments from "oo" (no payout) to "20" (maximum payout quantity per drum).

Example: For a nickel-dime drum arrangement (where A = 5¢, B = 10¢), press horizontal buttons until the display reads (01.02.) for one nickel and two dimes or (03.01.) for three nickels and one dime.

G. Repeat the above procedures in steps E and F to program Mode 3 ($1 payout), Mode 4 ($5 payout) and Mode 5 ($10 payout). If Changer is not equipped with a $5 or $10 bill validator, enter "00" for all drum positions in Mode 4 and Mode 5.

H. Press PROGRAM to return to Mode 1. Check display readouts for each of the five programs and correct any errors as needed.

I. Press RETURN TO READY, lock the control switch and remove the key. See "To Test Payouts" for additional instructions before placing the Changer in service.

To Program Bonus Payouts

Remove the payout switch cover and set the switch to "BON". Unlock the control switch and press PROGRAM button to advance to the desired Mode 1, 2, 3, 4, or 5. Enter the desired bonus payout quantity or "00" for each drum position. (Programing the BON program in Modes 1, 2, 3, 4, and 5 does not effect the 3, 4, or 5 program modes in the REG position, but does affect the 1 and 2 program modes in the REG position.

Example: With tokens in Drums A & B regular payback setting is 4 tokens for $1.00; but, during the bonus period, it will payout 6 tokens for $1.00. Program as follows:

1. With PAYOUT switch in REG position press PROGRAM button until mode 3 appears on Display.

2. Press OPERATOR buttons until Display reads "3 02.02."

3. With PAYOUT switch in BON position press PROGRAM button until mode 3 appears on Display.

4. Press OPERATOR buttons until Display reads "3 03.03."

5. With PAYOUT switch back in REG position in mode 3 the Display reads "3 02.02."

Press PROGRAM to return to Mode 1 for checking the bonus payouts. Press RETURN TO READY and lock the control switch after checking all program modes. See the following instructions before placing the Changer in service.

To Test Payouts

Press TEST button until "7" appears on the display mode window - "test pay" will appear in the message window. Set the payout switch to "REG" for regular payouts or to "BON" for bonus payouts. Press horizontal operator buttons "$1", "$5", or "$10" and check the change paid out to see that it equals the amount programmed. Repeat the tests by closing the Changer door and inserting bills or coins (see note below).

NOTE

Currency used in testing the programmed payouts is not counted with the customer transaction data (see "DATA RETRIEVAL", Section IV).

IV. FINAL CHECKOUT

Set the payout switch to "REG" or "BON" for the desired programmed payouts, and reinstall the switch cover. Press RETURN TO READY to reset the control module - display should be off and the READY light should be on (see "TROUBLESHOOTING", Section IV if diagnostics appears in the display). Refer to Section III for unit adjustments or removal/ replacement procedures.

SECTION III
ADJUSTMENT, REMOVAL, AND REPLACEMENT PROCEDURES

I. REMOVAL AND REPLACING DIME DRUM INSERTS

NOTE

Drum inserts are required for dime (10¢) payouts. Inserts may be used for nickel (5¢) payout to prevent Quarters from accidentally entering tube.

A. Remove drum from the Changer, remove the drum lid and empty all contents if drum was loaded with change.

B. Lay drum on its side on a suitable surface which will not scratch or dent the drum.

C. Rotate drum base cover (see Figure 3-1) until the two holes marked "10¢" are visible.

D. To Install Inserts

1. Hold insert inside the drum and engage the insert tab with the larger hole above the "10¢" mark. IMPORTANT: Insert is designed for mounting in one direction only - do not force tab into smaller hole.

2. Align insert with the smaller hole and secure with the mounting screw. Rotate drum base cover and repeat mounting procedure at the remaining locations-a total of nine inserts is required.

E. The same procedure is used to install inserts for 5¢ payout. The only difference is to install the inserts in the holes marked 5¢ instead of 10¢. See Figure 3-1.

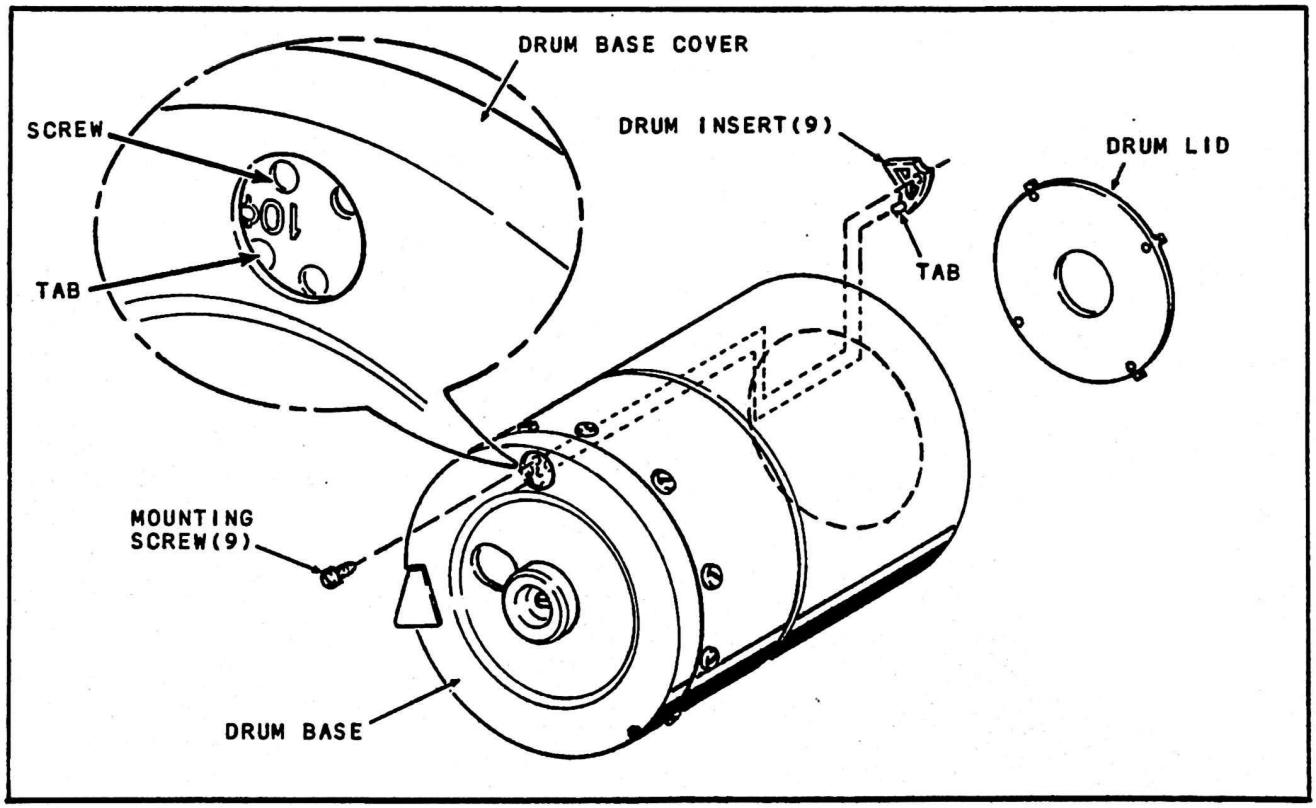


Figure 3-1. Removing/Replacing 10¢ Drum Inserts

F. To Remove Inserts

1. Remove plastic inserts at all nine mounting locations. Rotate drum base cover to remove each insert.

2. Place all inserts and mounting screws in a small bag and save for future use. Store parts on bottom of the Changer or inside the Cabinet Base, if equipped.

II. REMOVING AND REPLACING COIN TUBES

A. Use proper color-coded coin tubes for the following payouts.

Gray Tube - for nickels only

Red Tube - for dimes only (drum inserts required)

Blue Tube - for quarters, "A" tokens and "B" tokens

Yellow Tube - for SBA $1 coins, "C" tokens and "D" tokens

B. Empty existing coin tube if filled with change.

1. Turn on power switch.

2. Press RETURN TO READY.

3. Press horizontal operator button below the corresponding drum letter. Press once to start - press again to stop.

C. Remove corresponding drum from the Changer, remove the drum lid and empty all contents if drum was loaded with change.

D. To Remove Coin Tube

1. Turn off power switch.

2. Remove coin tube mounting screws (see Figure 3-2).

3. Depress empty sensor lever and lift out tube.

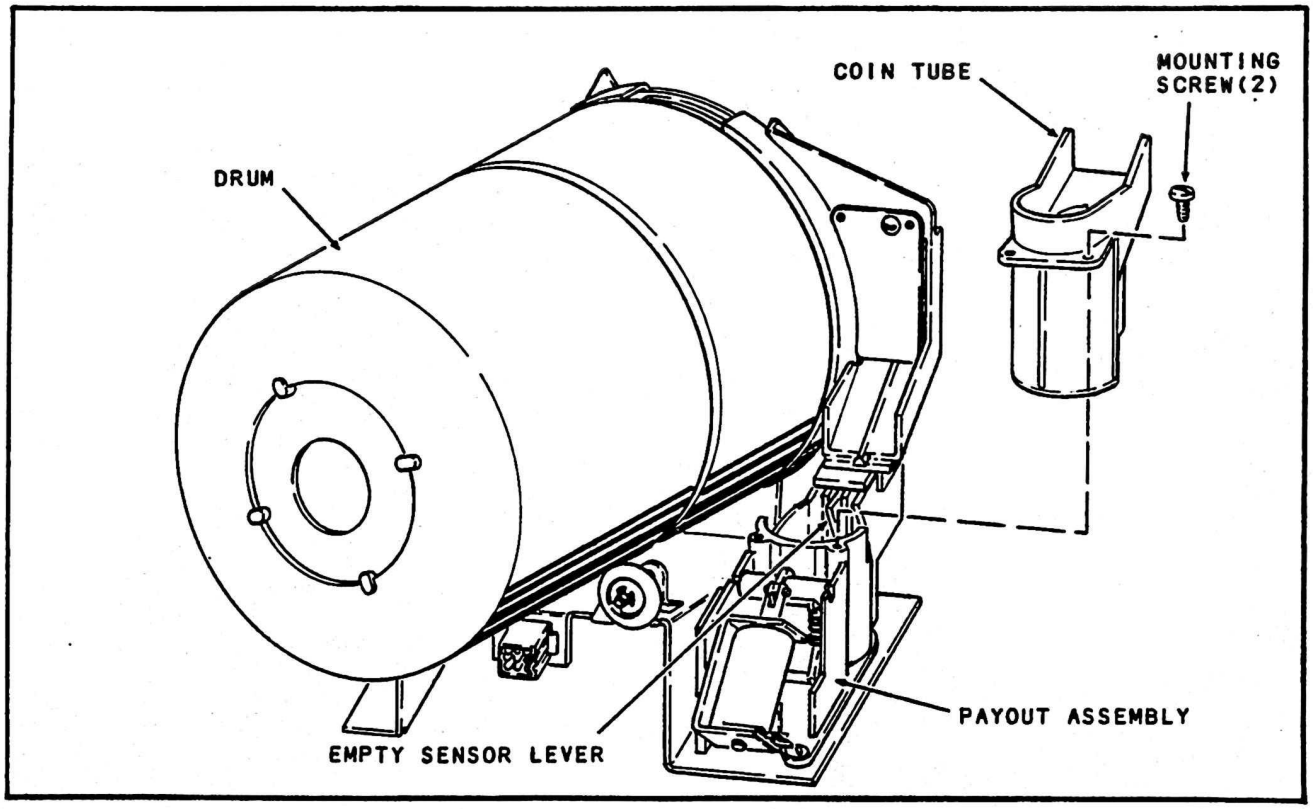


Figure 3-2. Removing/Replacing Coin Tube

E. To Install Coin Tube

1. Slide coin tube into the payout assembly and check to ensure the empty sensor level swings freely.

2. Secure coin tube with mounting screws (see Figure 3-2).

F. Reinstall the drum, reload with appropriate change and reinstall the drum lid. Turn on power switch.

III. REMOVING AND REPLACING THE BILL VALIDATOR

A. Shut off power at the Changer power switch.

B. To Remove Validator

1. Remove the thumbscrew shipping fastener (see Figure 3-3).

2. Remove validator from the mounting rails (attached to bill stacker) and disconnect the 9-pin connector.

C. To Install Validator

1. Set validator on the mounting rails (see Figure 3-3).

2. Connect the 9-pin connector at rear of validator.

3. Engage the four mounting posts with the mounting rail slots.

4. Optional: reinstall thumbscrew.

D. Turn on power.

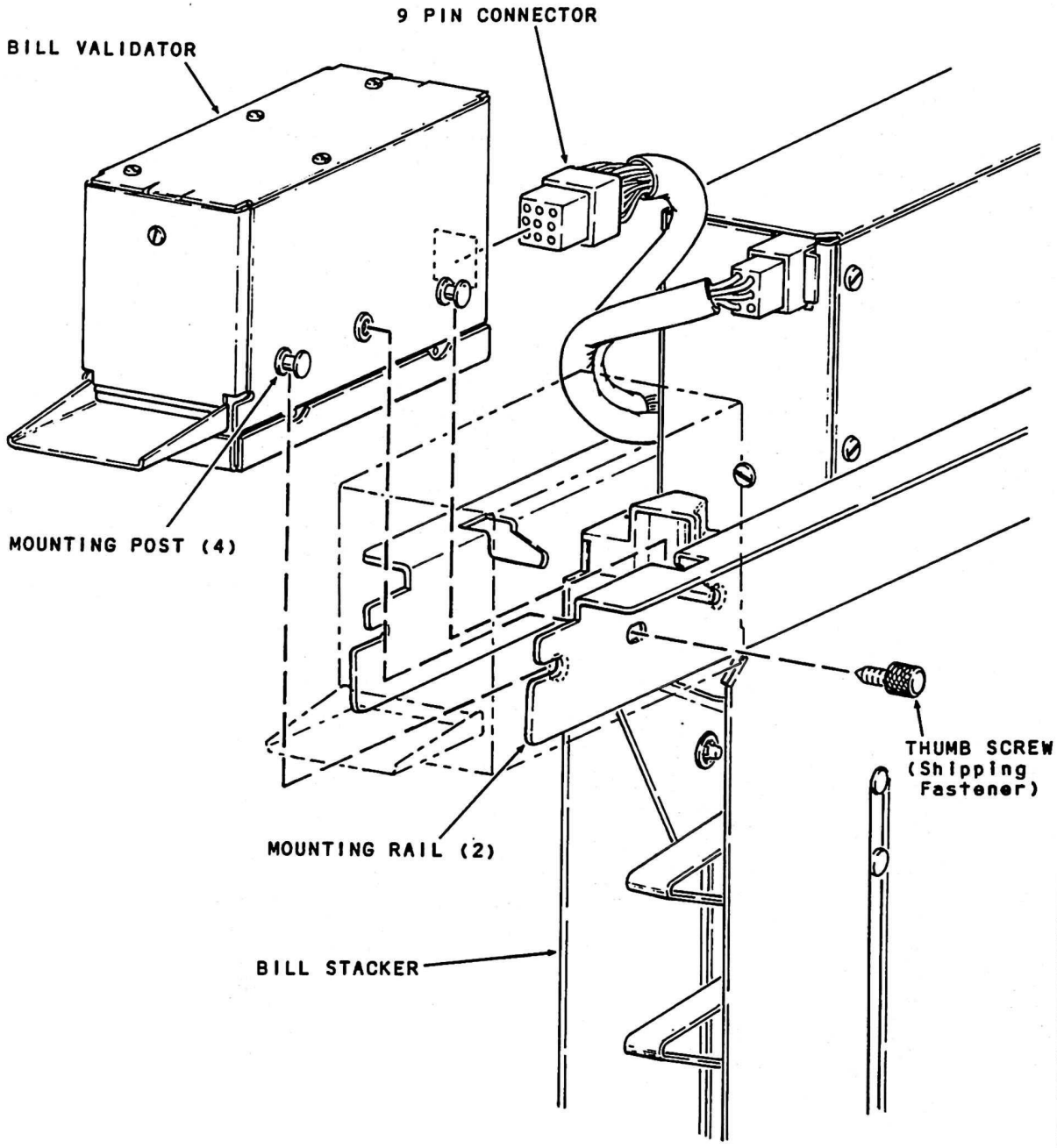


Figure 3-3. Removing/Replacing Bill Validator

SECTION IV
ROUTINE SERVICE

I. INVENTORY

Inventory of change maintained and money received by the CHANGETRON 2™ Currency Changer should be checked on a regular basis relative to the customer usage. Emptying all change drums and coin tubes at scheduled times, and then reloading the drums with predetermined quantities is the easiest method of inventory control.

To empty coin tubes: press RETURN TO READY on the control module and press STACK and $1 horizontal operator buttons. All payout solenoids will operate at the same time for 35 payouts, and then will shut off. Remove change from all drums, coins from the coin box and bills from the bill stacker. Currency and change can now be counted and compared with the data readout totals - see "Data Retrieval".

IMPORTANT

After refilling the change drums or emptying the change tubes, press FILL TUBES on the control module. Changer will not operate if the coin tubes required to make change are not refilled. "READY" light on door will be off until the Changer is ready for customer service.

Check for shingling in the tubes; i.e., check that coins are seated properly in the tubes, especially the 1st coin. Visually check or payout several coins for each tube by inserting Bills or coins.

II. DATA RETRIEVAL

The data retrieval button (DATA) is used for both displaying and resetting currency transaction information. Do not hold this button down except to clear the resettable data.

A. To Read Data

Press and release DATA for each of the following display readouts. Maximum stored data for each income total is $9999.95. "E" automatically rolls over after reading maximum data. Maximum stored data for each currency acceptance and payout total is 9999 - test transactions in Mode 7 are not totalled. Press RETURN TO READY before placing the Changer in customer service.

B. To Clear Data

All data shown in Table 4-1 except total income "E" can be cleared (reset to Zero). Once data has been recorded, simply press and hold DATA until the display reads "Clearing" (data clear initiated); then reads "All Clear" (data clear completed).

Press and release DATA to check each of the data readouts - all but "E" should read "00". Press RETURN TO READY before placing the Changer in customer service.

SYMBOL	DATA DISPLAY
E	Total Income - only nonresettable data
F	Total Regular + Bonus Income
G	Total Bonus Income
H	Total $10 Bills ("10") Accepted - future use
J	Total $5 Bills ("5") Accepted
L	Total $1 Bills ("1") Accepted
O	Total 25¢ Coins ("0.25") Accepted
P	Total 10¢ Coins ("0.10") Accepted
U	Total 5¢ Coins ("0.05") Accepted
y	Total $1 Coins ("SBA") Accepted-future use
A	Total "A" Drum Payouts
b	Total "B" Drum Payouts
C	(Not used)
d	(Not used)

Table 4-1. CHANGETRON 2™ Data Readouts

III. TROUBLESHOOTING

When the CHANGETRON 2™ Currency Changer is plugged in and power is turned on, the control module (see Figure 2-2) will electronically detect most malfunctions related to the changer components, currency acceptance and change payouts. The changer will not accept coins or bills should a malfunction occur. The door "READY" light will go off (see note) and one or more diagnostic symbols will appear in the control module display (see Table 4-2).

NOTE

The "READY" light on the door will be off when programming the control module or during data retrieval. The "TEMPORARILY OUT OF SERVICE" light will come on when the coin tubes have insufficient change for the largest payout programmed.

To test the diagnostics, press TEST on the control module until Mode 6 appears in the display. All diagnostic symbols except "rEProg"

SYMBOL	ON	BLINKING	OFF
A	"A" drum & payout O.K.	"A" drum disconnected or payout tube empty.	"A" drum disconnected. (payout not programmed)
b	"B" drum & payout O.K.	"B" drum disconnected or payout tube empty.	"B" drum disconnected. (payout not programmed)
C	(Not used)	(Not used)	(Not used)
d	(Not used)	(Not used)	(Not used)
S	Bill stacker O.K.	Stacker disconnected or motor cam out of position.	Main power off.
r	Coin sensor O.K. (coin rejector/verifier)	Coin sensor error. (see note * below)	Coin sensor disconnected.
b	Backup battery O.K.	Battery low or defective.	Main power off.
rEProg	Reprogram - payout program error detected.	Symbol does not blink.	Payout program O.K.
*NOTE: If coin sensor error occurs, press RETURN TO READY to clear 10 min. security timer.			

Table 4-2. CHANGETRON 2™ Diagnostic Readouts

should illuminate if all wiring harnesses are properly connected. To test the display (Mode 8), press and hold TEST - "8.8.8.8.8.8.8.8." will appear across the display when all vacuum fluoresent display elements are operative.

A wiring diagram is provided in Section V. Do not replace the fuse or reset the circuit breaker (on the Junction Box) more than once before locating and resolving the probable causes. Refer to the CHANGETRON 2™ Service Manual for detailed troubleshooting and servicing assistance.

IV. PARTS AND SERVICE

The CHANGETRON 2™ Currency Changer is quality engineered and tested to provide years of continuous, dependable service.

Always turn off the power switch before servicing or cleaning. Do not use aerosol cleaners, or spray waxes containing silicone, inside the changer.

WARNING

To avoid hazard of electrical shock when using liquid cleaners, unplug the changer power cord or shut off power to the wall receptacle. Make certain all components are thoroughly dry and properly installed before restoring power.

Refer to the CHANGETRON 2™ Service and/or Parts Manual(s) for additional service information and parts replacement. For factory assistance, contact the nearest National Vendors representative.

SECTION V
CIRCUITRY

This Section is supplied as an aid in understanding the Electrical Circuitry.

WARNING

To avoid shock:

1. **Unplug the power cord before making a continuity check.**

2. **Make all tests with a Volt-Ohmmeter. DO NOT use an incandescent lamp or jumper wire.**

The color code used on wiring diagrams is shown in the following list. When two colors are shown, the first is the solid color of the wire and the second is the color of the stripe (e.g. "Blk-Wht" is a black wire with a white stripe). Color plus a number indicates that number is printed on that particular wire.

Code		Color
BLK	-	Black
BLU	-	Blue
BRN	-	Brown
GRN	-	Green
GY	-	Gray
ORN	-	Orange
PINK	-	Pink
PR	-	Purple
RED	-	Red
TAN	-	Tan
WHT	-	White
YEL	-	Yellow

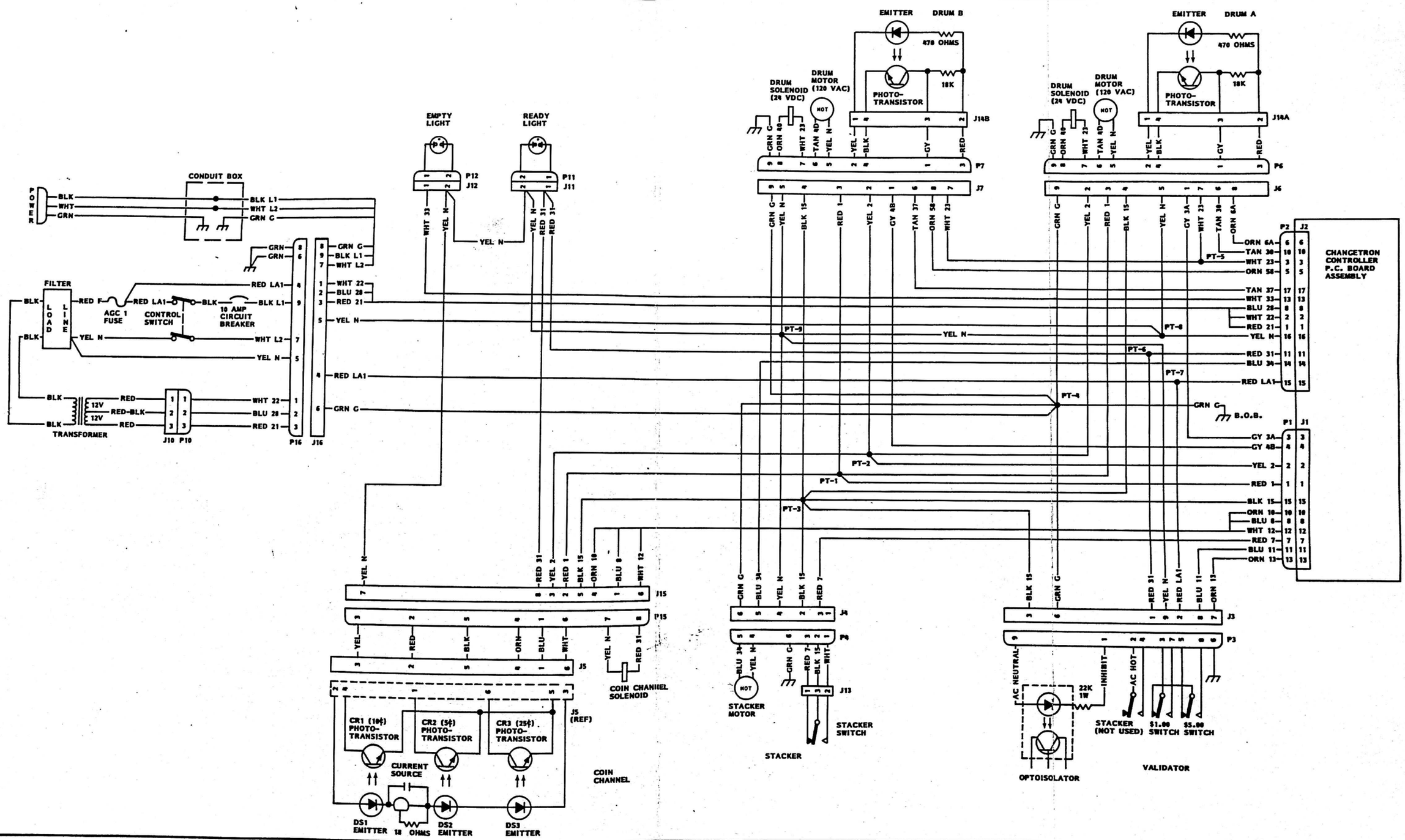


Figure 5-1. Changetron 2 Wiring Diagram

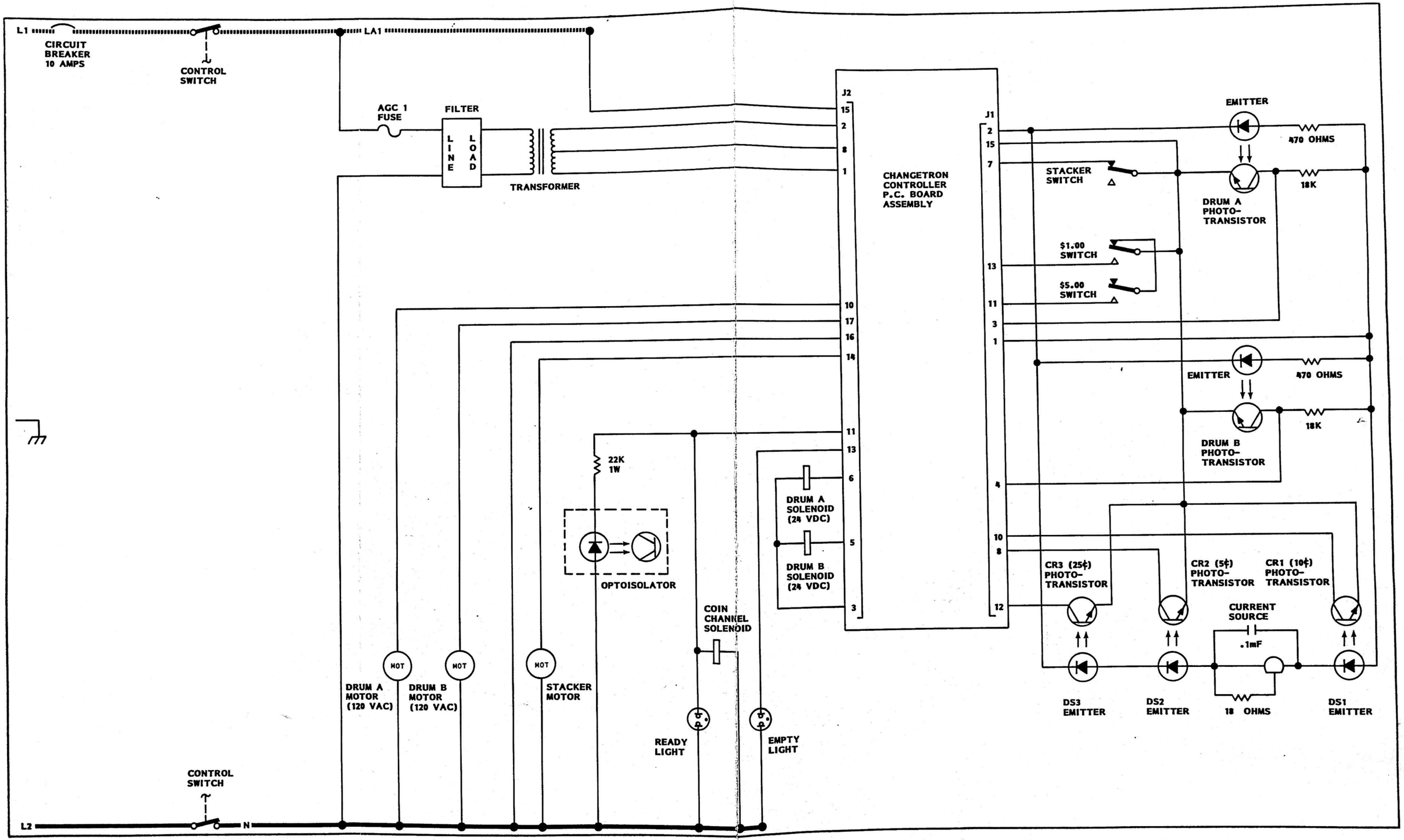


Figure 5-2. Changetron 2 Schematic Diagram

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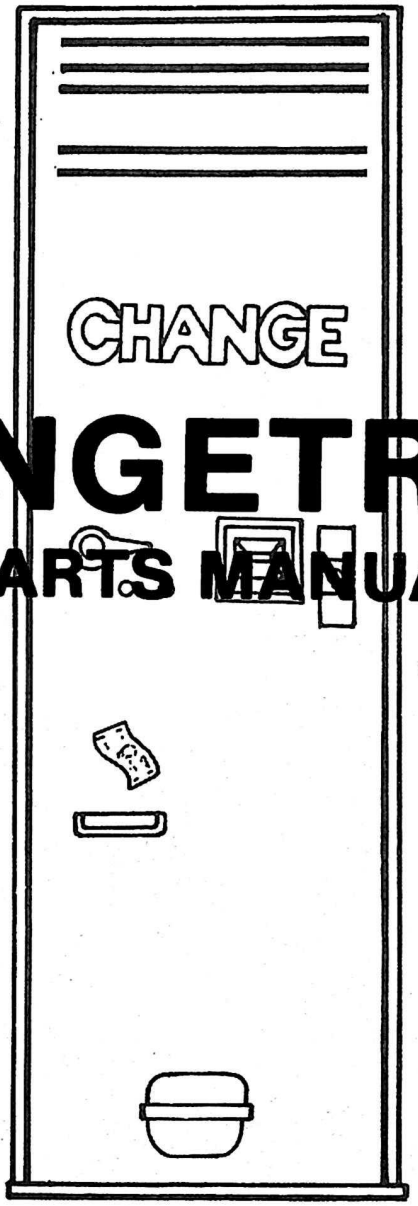

CHANGETRON 2™

PARTS MANUAL

CRANE

NATIONAL VENDORS
12955 Enterprise Way
Bridgeton, MO 63044

5002481

JUNE 1990
Rev. B

WARRANTY

The CHANGETRON 2™ Changer is warranted for one (1) year against defective parts and workmanship. Any part or parts which are proven to be defective within one (1) year of the date of shipment will be repaired or replaced free of charge when the defective part is returned, with transportation charges prepaid, to the destination designated by the National Vendors Warranty Department.

All refrigeration units and icemakers are warranted on the above basis for a period of one (1) year of the date of shipment.

This warranty applies only to the original purchaser of the Changer and is null and void if the Changer is sold during the period of warranty.

This warranty is also null and void for all electrical components, wiring, or circuits, and/or for all mechanical parts or assemblies damaged as a result of operating the Changer at other than 110-120 volts, 60 Hertz current. The warranty is null and void in event of vandalism, fire, or negligence on the part of the operator.

No warranty is given or implied on incandescent lamps, neon lamps, fluorescent lamps, ballast, or starters, and other expendable items. No warranty will be given when other manufactured components are installed in National Vendors Merchandisers.

Further, National Vendors is not responsible for any cost of service rendered, or repairs made on merchandiser or parts, at other than National Vendors; or by anyone other than an authorized factory service representative of National Vendors; unless authorization to incur such expense has been given in writing by National Vendors prior to incurring such expense.

This warranty is in lieu of all other warranties expressed or implied, including, without limitation, warranties of merchantability, and all other obligation or liabilities on National Vendors part; and National Vendors neither assumes, nor authorizes any person to assume for it, any other obligation or liability in connection with the sale of said equipment or any part thereof.

CRANE-National Vendors
12955 Enterprise Way
Bridgeton, MO 63044

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5002481

SPECIFICATIONS

SIZE: Height - 72" (182.9 cm) with Base
43 3/4" (111.1 cm) without Base

Width - 10" (25 cm)

Depth - 15-1/4" (38.6 cm)

WEIGHT: 112 lbs. (50.8 kg) - Changer only
23 lbs. (10.4 kg) - Base only

POWER REQUIREMENTS: 120 Volts A.C.
60 Hertz - Single Phase
3 Amps

U.S. CURRENCY: Nickels, Dimes, Quarters, $1 Bills, $5 Bills (bill acceptance varies, depending upon the Bill Validator)

DRUM CAPACITIES:

U.S. Coins

Nickels	2200	($ 110)
Dimes	3000	($ 300)
Quarters	1800	($ 450)
SBA $1	1300	($1300)

Tokens

"A" (.882")	(Use 25¢ Tube)
"B" (.900")	(Use 25¢ Tube)
"C" (.987")	(Use $ Tube)
"D" (1.000")	(Use $ Tube)

STACKER CAPACITY: 1600 Bills

COIN MECH: Optional

SECTION 4
ILLUSTRATED PARTS BREAKDOWN

This section contains the Parts Breakdown for each assembly. Each illustration shows an exploded view with index numbers. These numbers correspond with the numbers in the parts list column headed INDEX NO. The DESCRIPTION column lists the name of each part or assembly. The PART NUMBER and the NO. REQ. columns list the part number and quantity of each part or assembly respectively.

HOW TO USE THE PART LIST

To locate a part number, choose the figure from the list of illustrations which uses the part or assembly desired. Turn to that figure and locate the part or assembly with its index number. Find the index number in the parts list and read across for a complete description.

HOW TO ORDER

To avoid delays and errors in shipping, give the part number, complete description, and quantity required. Also, include the Model Name and Serial No.

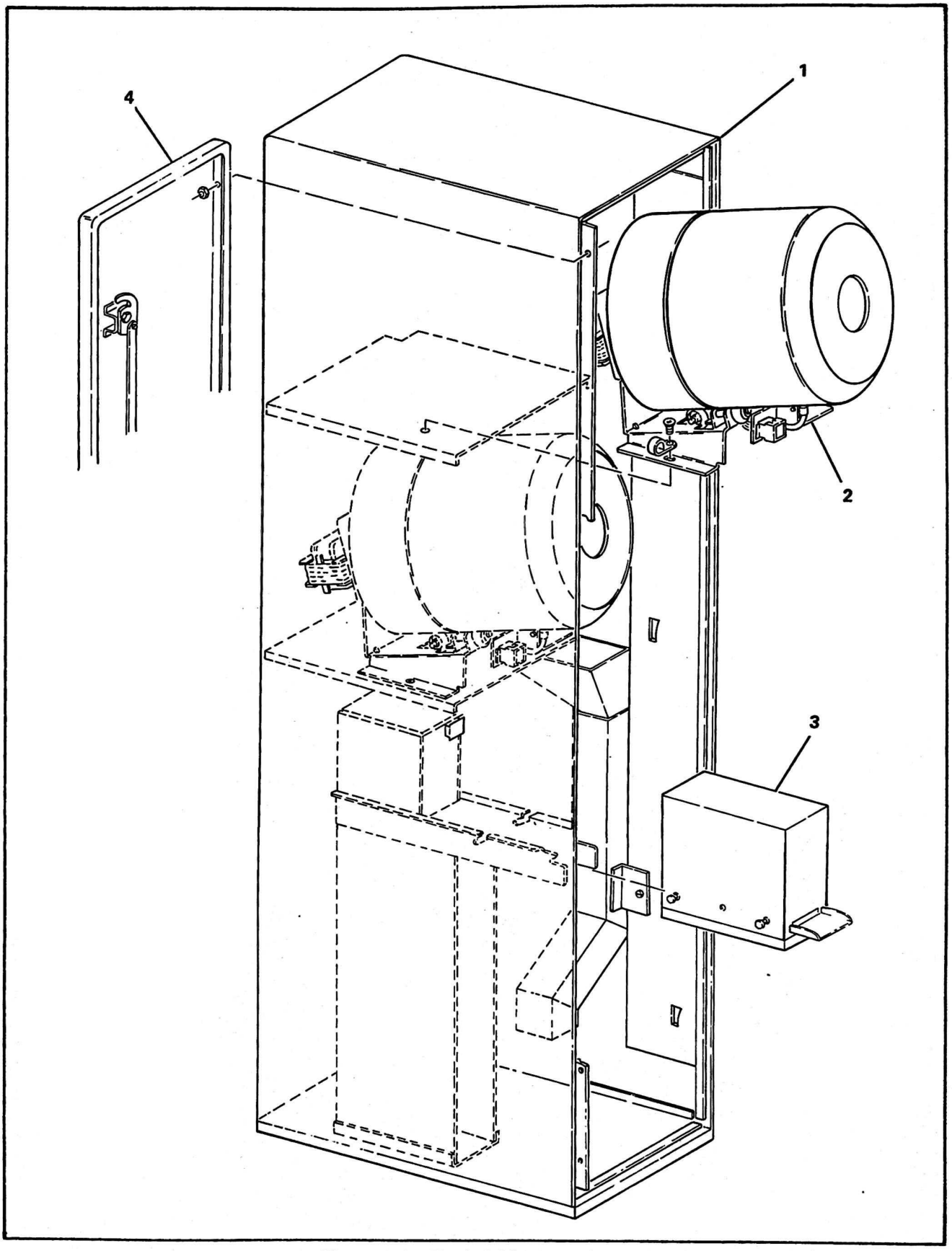


Figure 4-1. Final Cabinet Assembly

Index No.	Description	Part Number	No. Req.
	Cabinet Assembly, Final	5002120	1
1	Cabinet Assembly (See Figure 4-2)	5002100	1
2	Drum and Payout Assembly, 25¢ Drum and Payout Assembly, 5¢ (See Figure 4-9)	5004501 5004503	1 1
3	Validator	5261215	1
4	Door Assembly, Cabinet (See Figure 4-8)	5002400	1

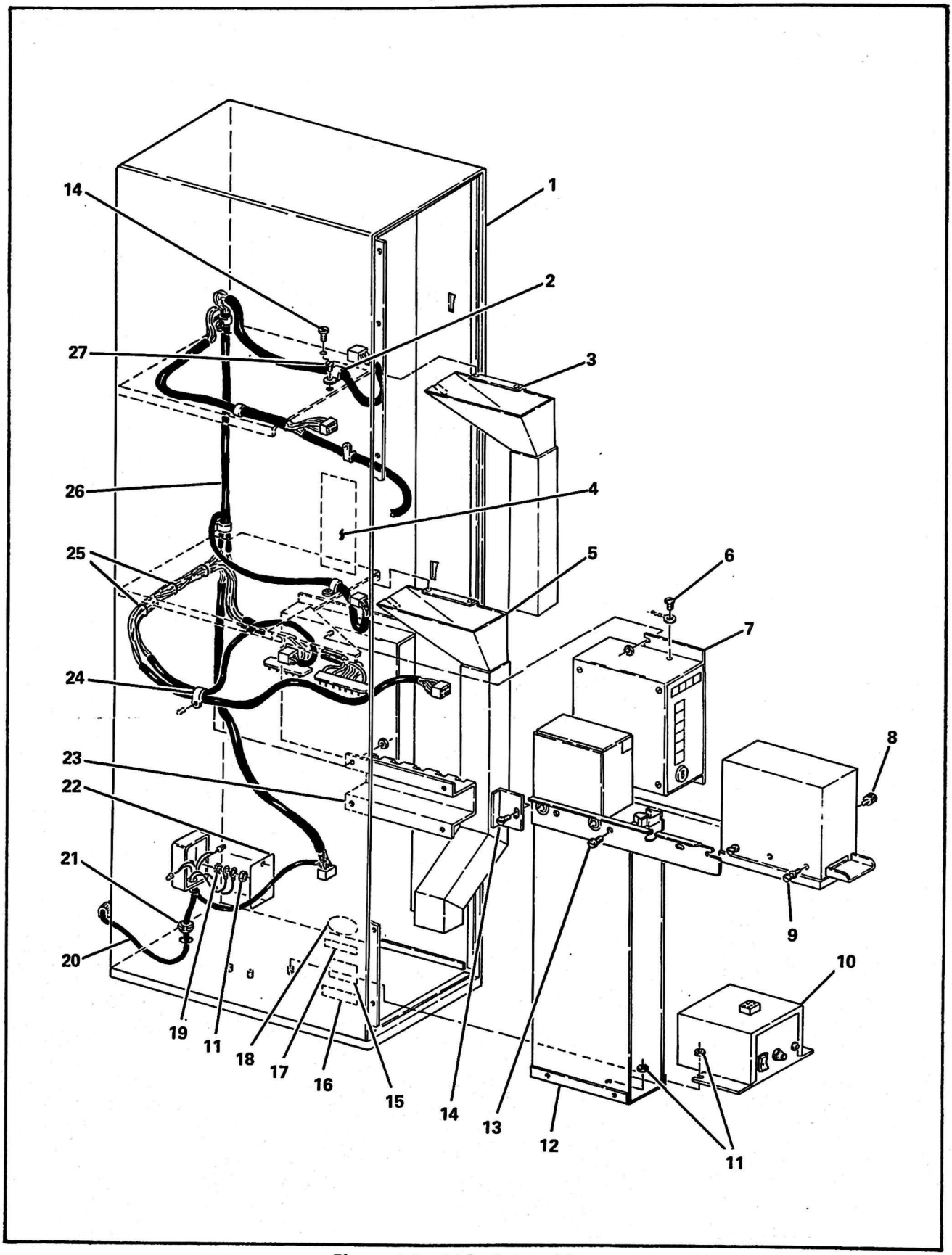


Figure 4-2. Cabinet Assembly

Index No.	Description	Part Number	No. Req.
	Cabinet Assembly (See Figure/Index 4-1/1 for next higher assembly)	5002100	Ref.
1	Weld Assembly, Cabinet	5002121	1
2	Cable Clamp	3106144	2
3	Weld Assembly, Upper, Payout	5002110	1
4	Label, Drum	5002117	1
5	Weld Assembly, Lower, Payout	5002105	1
6	Screw, Sheet Metal, No.8 x 3/8	4047056	1
7	Module Assembly, Control (See Figure 4-7)	5004700	1
8	Thumbscrew, Sidewall	2206028	1
9	Shoulder Screw	5277354	4
10	Box Assembly, Junction (See Figure 4-4)	5004175	1
11	Keps Nut, No.10-32	9900164	13
12	Stacker Assembly, Bill, with Brackets (See Figure 4-5)	5004601	1
13	Screw, Lock Plate	5264629	2
14	Screw, No.6-20 x 5/16 PHS S/T	6134031	5
15	Label, 582	5002118	1
16	Label, UL Listing	2221599	1
17	Label, For Indoor Use Only	3121007	1
18	Union Label	2221039	1
19	Lockwasher, No.10 External	2306487	1
20	Grounded Cordset Assembly	5004160	1
21	Bushing	2221043	1
22	Junction Box Cover	3116132	1

Index No.	Description	Part Number	No. Req.
23	Bracket, Stacker Mounting	5004126	1
24	Cable Clamp		
25	Wire Tie	5230618	5
26	Harness Assembly (See Figure 4-3)	5002240	1
27	Screw, No.8-32 x 3/8 RHS T/C	9900173	6
	Parts Package (not shown)	5002465	1

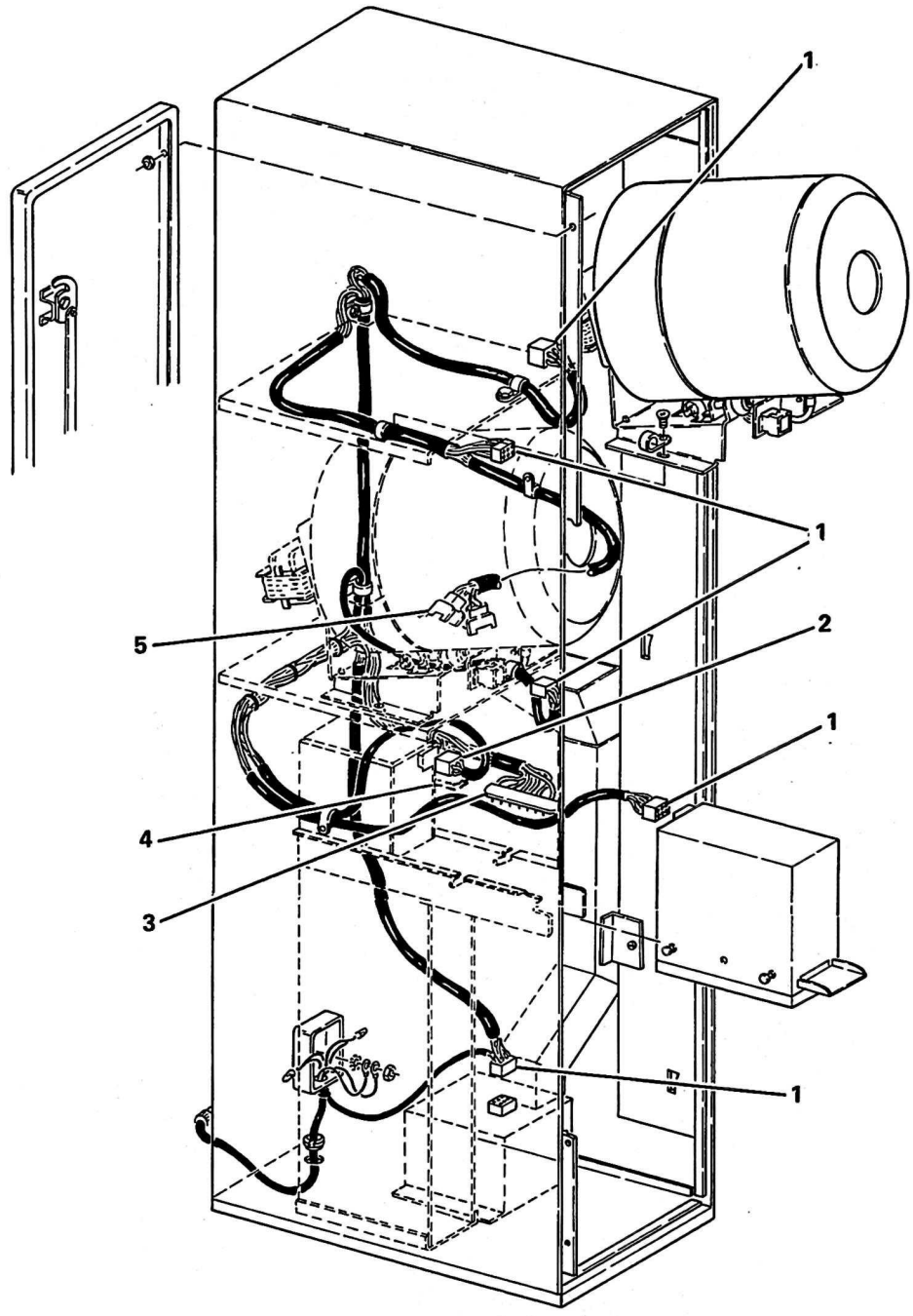


Figure 4-3. Harness Assembly

Index No.	Description	Part Number	No. Req.
	Harness Assembly (See Figure/Index 4-2/26 for next higher assembly)	5002240	Ref.
1	Receptacle, 9 Circuit, w/o Ears (J3,6,7,15,16) (Terminals 1211144)	3116030	5
2	Receptacle, 6 Circuit, w/o Ears (J4) (Terminals 1211144)	3116035	1
3	Connector, PCB, 18 Circuit (P2)	1306124	1
4	Connector, PCB, 15 Circuit (P1)	6132111	1
5	Housing, Cap, 2 Circuit (J11, 12) (Terminals 9984509 except position 1 of J12 is Terminal 4241103)	4245037	2

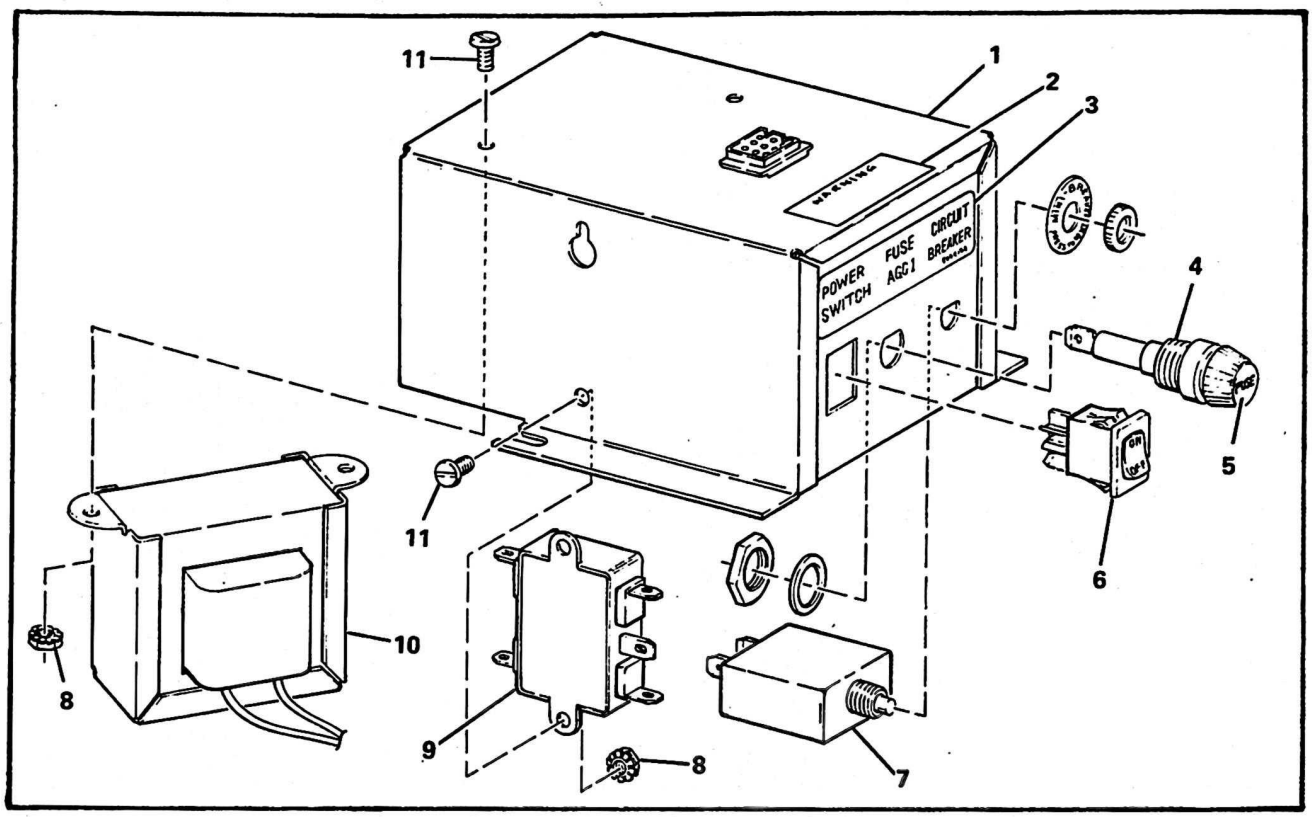


Figure 4-4. Junction Box Assembly

Index No.	Description	Part Number	No. Req.
	Box Assembly, Junction (See Figure/Index 4-2/10 for next higher assembly)	5004175	Ref.
1	Weld Assembly, Junction Box	5004151	1
2	Label, Warning	5004159	1
3	Label, Junction Box	5004158	1
4	Fuseholder Assembly (attaching parts supplied)	2301071	1
5	Fuse, 1 Amp (inside fuseholder)	5202048	1
6	Switch, Miniature Rocker	5004157	1
7	Circuit Breaker, 10 Amp (attaching parts supplied)	6131045	1
8	Nut, No.8-32 w/Lockwasher	9900081	5
9	Interference Filter	9989100	1
10	Assembly, Transformer	5004480	1
11	Screw, No.8-32 x 3/8 PHS w/Lockwasher	9900023	5
	Harness, Junction Box (not shown)	5004185	1

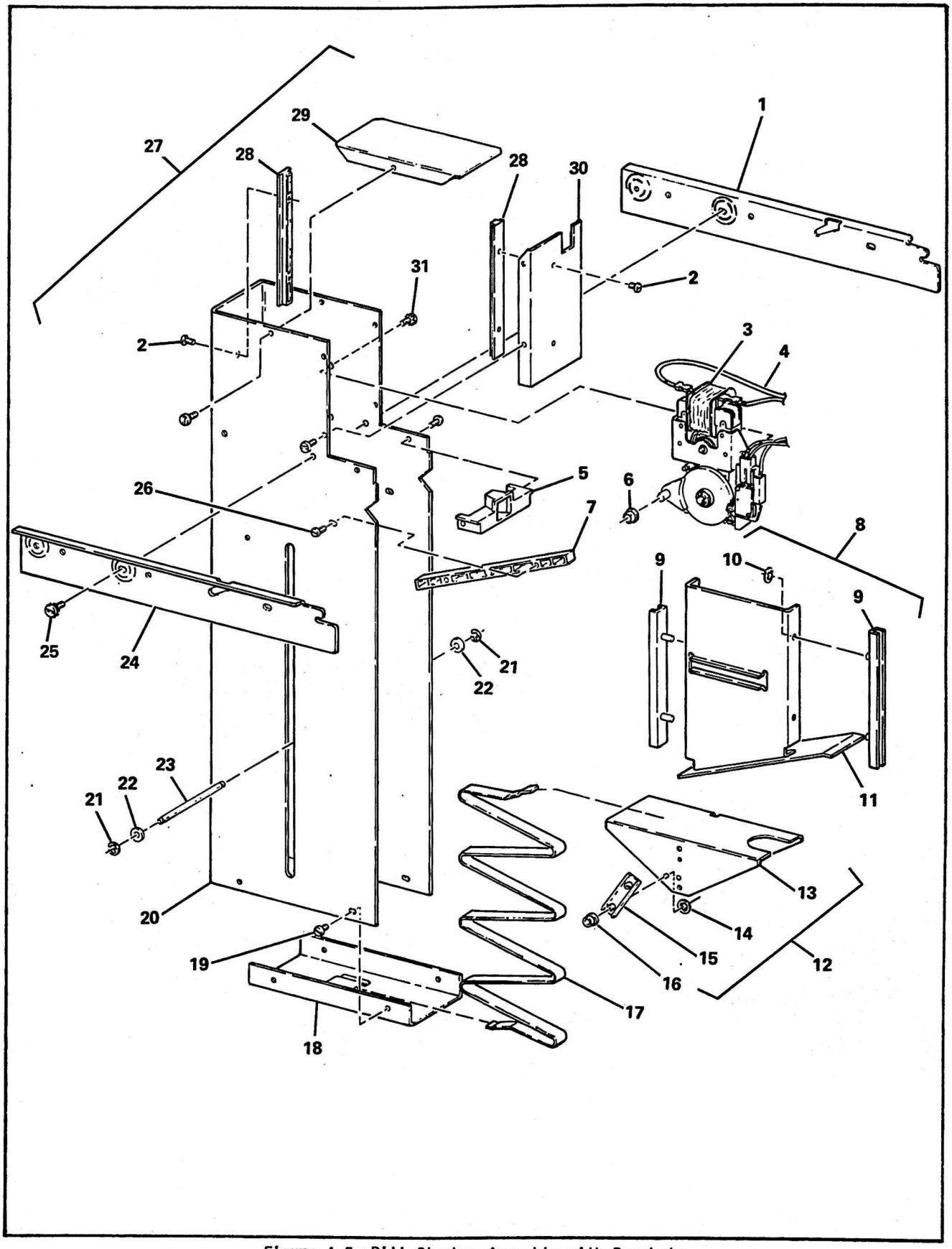


Figure 4-5. Bill Stacker Assembly with Brackets

Index No.	Description	Part Number	No. Req.
	Stacker Assembly, Bill, w/Brackets (See Figure/Index 4-2/12 for next higher assembly)	5004601	Ref.
1	Plate, Validator, Mounting Right	5004616	1
2	Screw 6-20 x .25 PHS T/C	5004638	6
3	Motor Assembly, Stacker	5004633	1
4	Harness, Stacker	5004645	1
5	Alignment Block	5274074	1
6	Bearing, Flange	5004614	1
7	Currency Retainer Rail	5004607	2
8	Assembly, Pusher Plate	5004619	1
9	Pusher Plate Guide	5004610	2
10	Retainer, Push-on .187	5201266	4
11	Weld Assembly, Plate	5004620	1
12	Platform Assembly, Bill	5004618	1
13	Platform Assembly	5272268	1
14	Retainer, Push On, .125	1217162	4
15	Bill Platform Guide	5004612	2
16	Bearing	5264789	4
17	Spring, Platform	5004613	1
18	Weld Assembly, Mounting Plate	5004623	1
19	Screw, No.6-32 x 1/4 PHS T/F	5230625	10
20	Weld Assembly, Stacker Housing	5004625	1
21	Retaining Ring, Reinforced "E" Type, .187	9900418	2
22	Nylon Washer	5220042	2
23	Rod, Spring Retainer	5004617	1

Index No.	Description	Part Number	No. Req.
24	Plate, Validator Mounting, Left	5004615	1
25	Screw, No.8-32 x 1/4 PHS W/Lockwasher	9900138	4
26	Screw, No.8-18 x 3/8 PHS Tapping	7207019	4
27	Stacker Assembly, Bill	5004600	1
28	Pusher Guide	5004609	2
29	Cover, Stacker	5004606	1
30	Plate, Front	5004605	1
31	Screw, No.6-32 x 5/16 THS w/Lockwasher	9900151	3

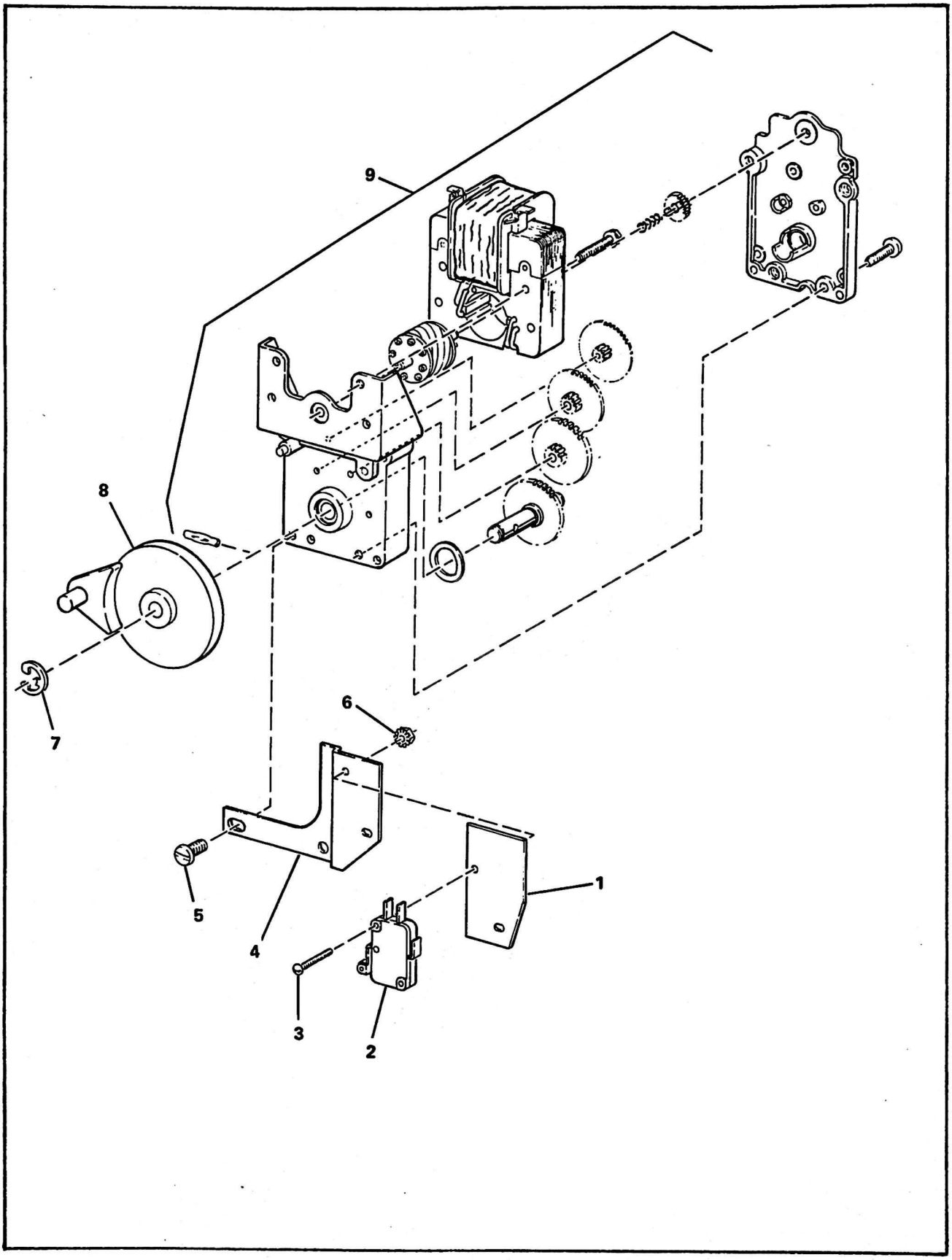


Figure 4-6. Stacker Motor Assembly

Index No.	Description	Part Number	No. Req.
	Motor Assembly, Stacker (See Figure/Index 4-5/3 for next higher assembly)	5004633	Ref
1	Insulation	5263723	1
2	Switch, Roller Lever	2304109	1
3	Screw, No.4-40 x 5/8 RHS	1217160	2
4	Bracket, Switch	5004608	1
5	Screw, No.8-32 x 5/16 THS T/C	9900166	2
6	Nut, No.4-40 w/Lockwasher	1217159	2
7	Retaining Ring, Reinforced "E" Type, .250	9900425	1
8	Cam, Stacker Cycle	5004611	1
9	Assembly, Motor and Pin	5004635	1

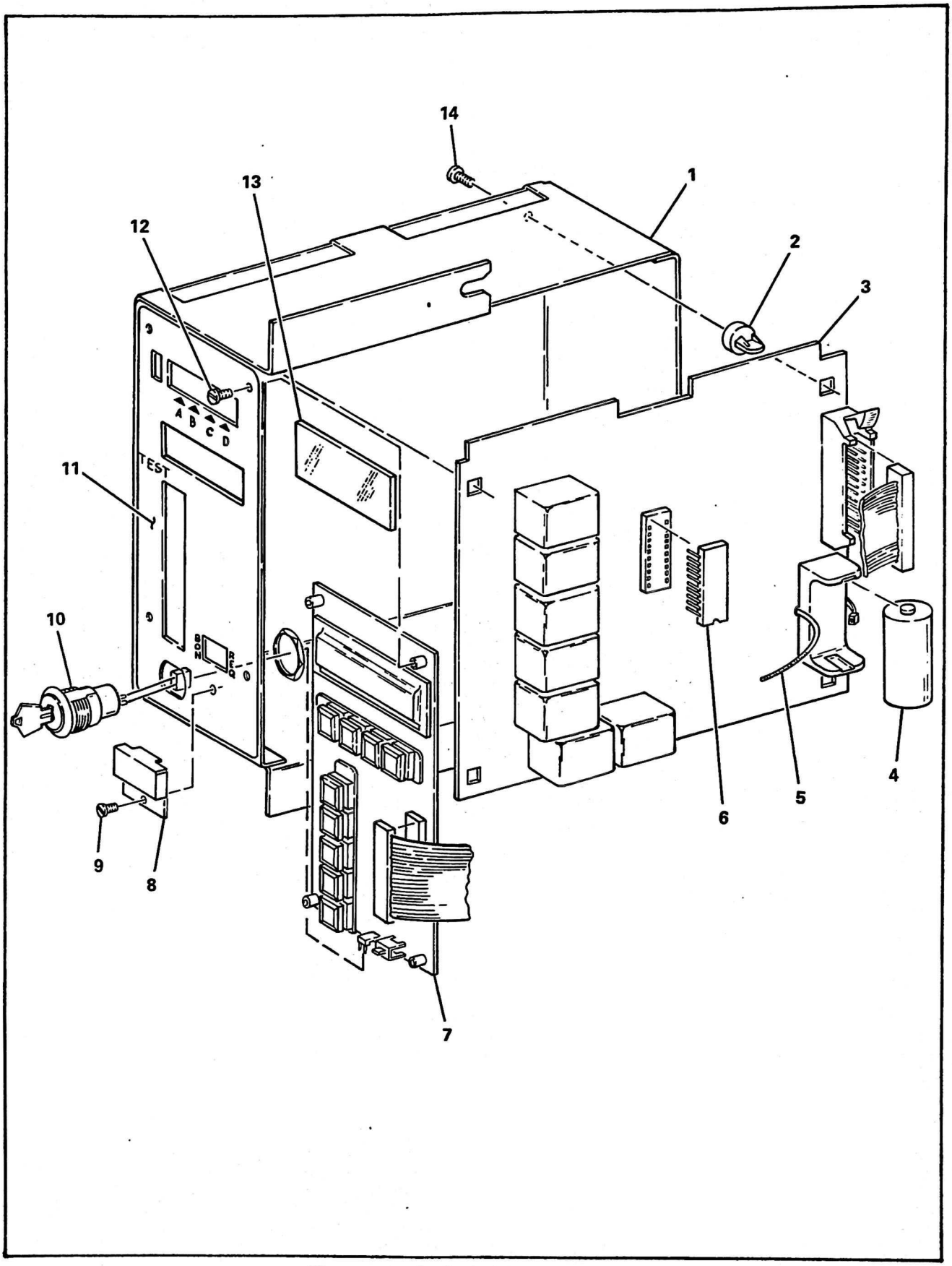


Figure 4-7. Control Module Assembly

Index No.	Description	Part Number	No. Req.
	Module Assembly, Control (See Figure/Index 4-2/7 for next higher assembly)	5004700	Ref.
1	Program Control Box	5004724	1
2	Plastic Expansion Nut, .250	9989329	4
3	PCB Assembly, Controller	5004730	1
4	Battery, Lithium 3V, 2/3A	9989345	1
5	Wire Tie, Self Clinching, Small	4042121	1
6	Subassembly, EPROM	5004742	1
7	PCB Assembly, Changetron, Program	5004735	1
8	Cover, Slide Switch	5004726	1
9	Screw, 4-40 x 1/4 PHS T/F	5004747	1
10	Switch Assembly, Keylock	1452097	1
11	Label, Programmer	5004723	1
12	Screw, 6-32 x 1/4 PHS	9900124	4
13	Lens, Display	5004725	1
14	Screw, No.8-18 x 1/2 PHS	1451112	4

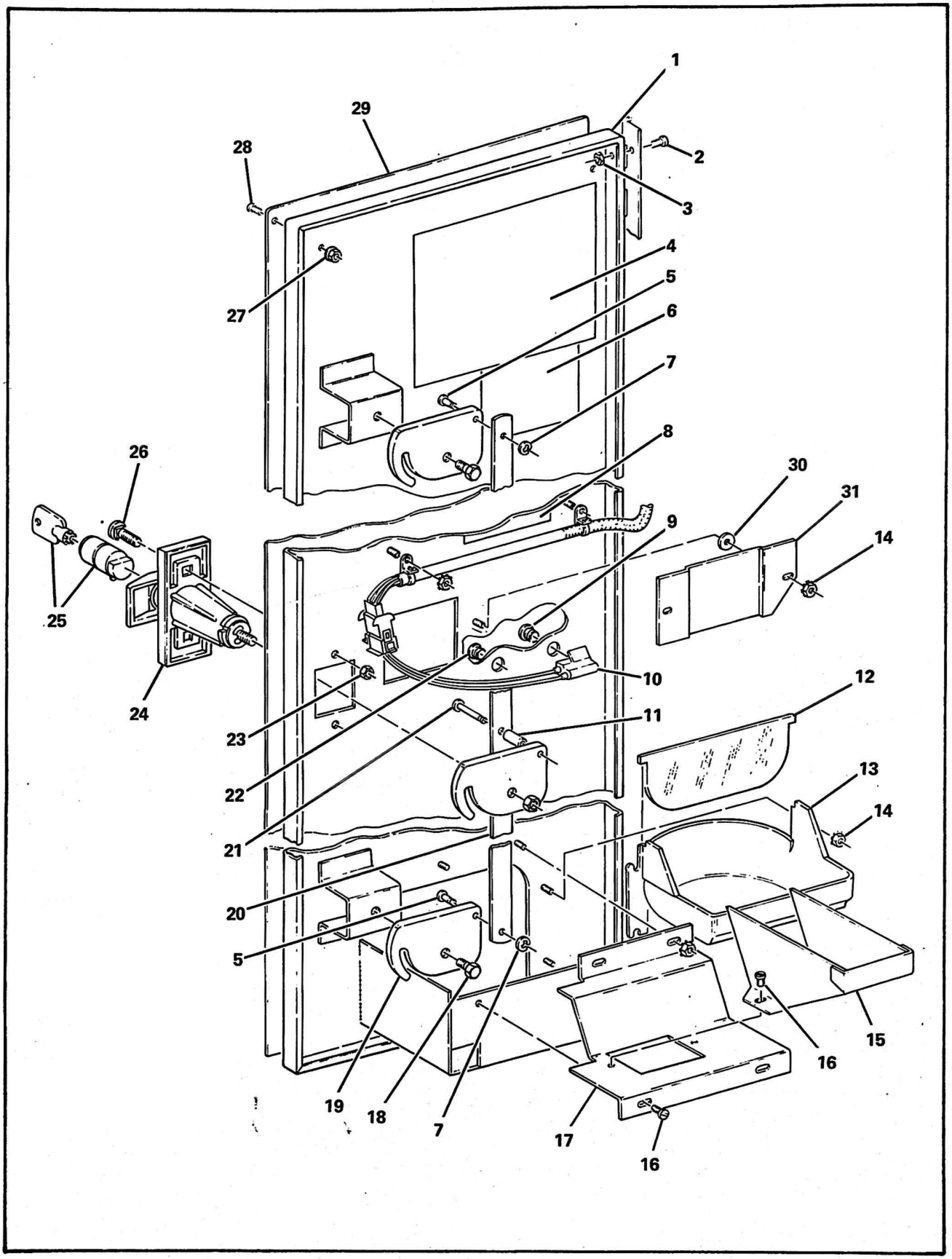


Figure 4-8. Cabinet Door Assembly

Index No.	Description	Part Number	No. Req.
	Door Assembly, Cabinet (See Figure/Index 4-1/4 for next higher assembly)	5002400	Ref.
1	Weld Assembly, Cabinet Door	5002410	1
2	Screw, No.8-32 x .37 PHS w/Lockwasher	9900023	11
3	Nut, No.8-32	9900029	11
4	Label, Door	5004485	1
5	Latch Pin	5004190	2
6	Label, Important	5004486	1
7	Retaining Ring E .187	9900122	3
8	Label, FCC Approval	5580074	1
9	Lens, Indicator, White	5004418	1
10	Light Assembly, Indicator	5004417	2
11	Latch Spacer	5264301	1
12	Coin Cup Door	5273639	1
13	Coin Cup	5004420	1
14	Keps Nut, No.10-32	9900164	10
15	Funnel, Coin Cup	5002416	1
16	Screw, No.8-32 x 3/8 RHS T/C	9900173	4
17	Cover, Coin Cup	5002415	1
18	Shoulder Screw	5264637	2
19	Latch Plate	5275060	3
20	Latch Bar	5273464	1
21	Latch Pin	5264191	1
22	Lens, Red	5277184	1
23	Nut, No.10-24	9900152	2
24	T-Handle	5263896	1

Index No.	Description	Part Number	No. Req.
25	Lock, Tumbler/Key	5263897	1
26	Base Plate, Carriage Bolt	2221908	2
27	Lock Nut, Palnut	5274168	9
28	Screw, Panel	5004472	9
29	Panel, Door	5002450	1
30	Washer, Steel, 7/16 O.D. x .203 I.D. x .062	9900067	2
31	Plate-Door Filler	5002420	1

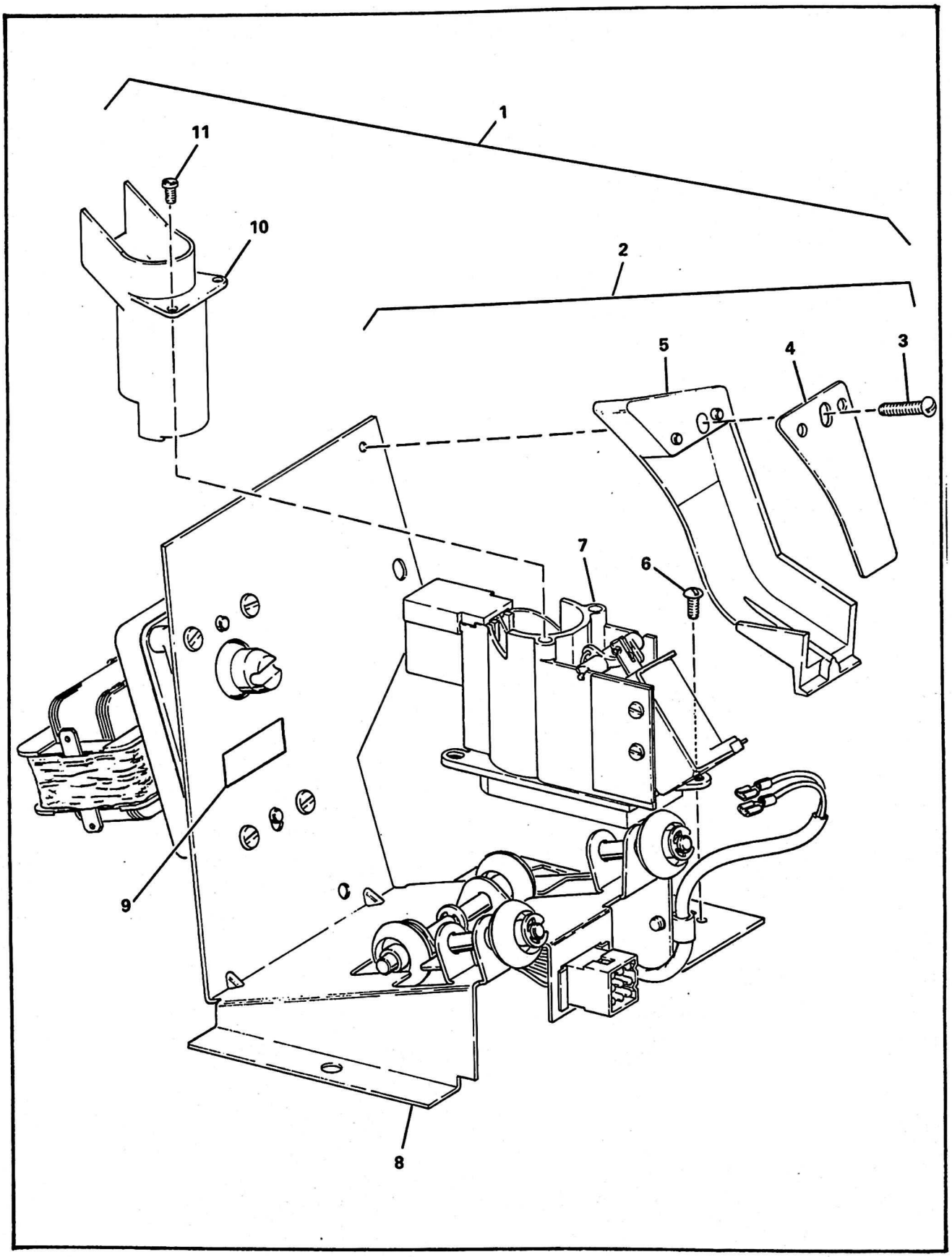


Figure 4-9. Drum and Payout Assembly

Index No.	Description	Part Number	No. Req.
	Drum and Payout Assembly, 25¢ Drum and Payout Assembly, 5¢ (See Figure/Index 4-1/2 for next higher assembly)	5004501 5004503	Ref. Ref.
1	Frame and Payout Assembly, 25¢ Frame and Payout Assembly, 5¢	5004506 5004508	1 1
2	Frame and Payout Assembly	5004510	1
3	Screw, No.8-32 x .88 RHS T/C	1419034	1
4	Cover, Drum Chute	5004559	1
5	Chute, Drum	5004558	1
6	Screw, No.8-32 x 5/16 THS T/C	9900166	2
7	Payout Assembly (See Figure 4-10)	5004540	1
8	Frame Assembly, Payout (See Figure 4-11)	5004511	1
9	Label, Caution	5263095	1
10	Quarter Tube (BLUE) Nickel Tube (GRAY)	5004594 5004592	1 1
11	Screw, No.6-20 x 1/2 RHS T/C	2222175	2
	Drum Assembly (not shown) (See Figure 4-12)	5004570	2

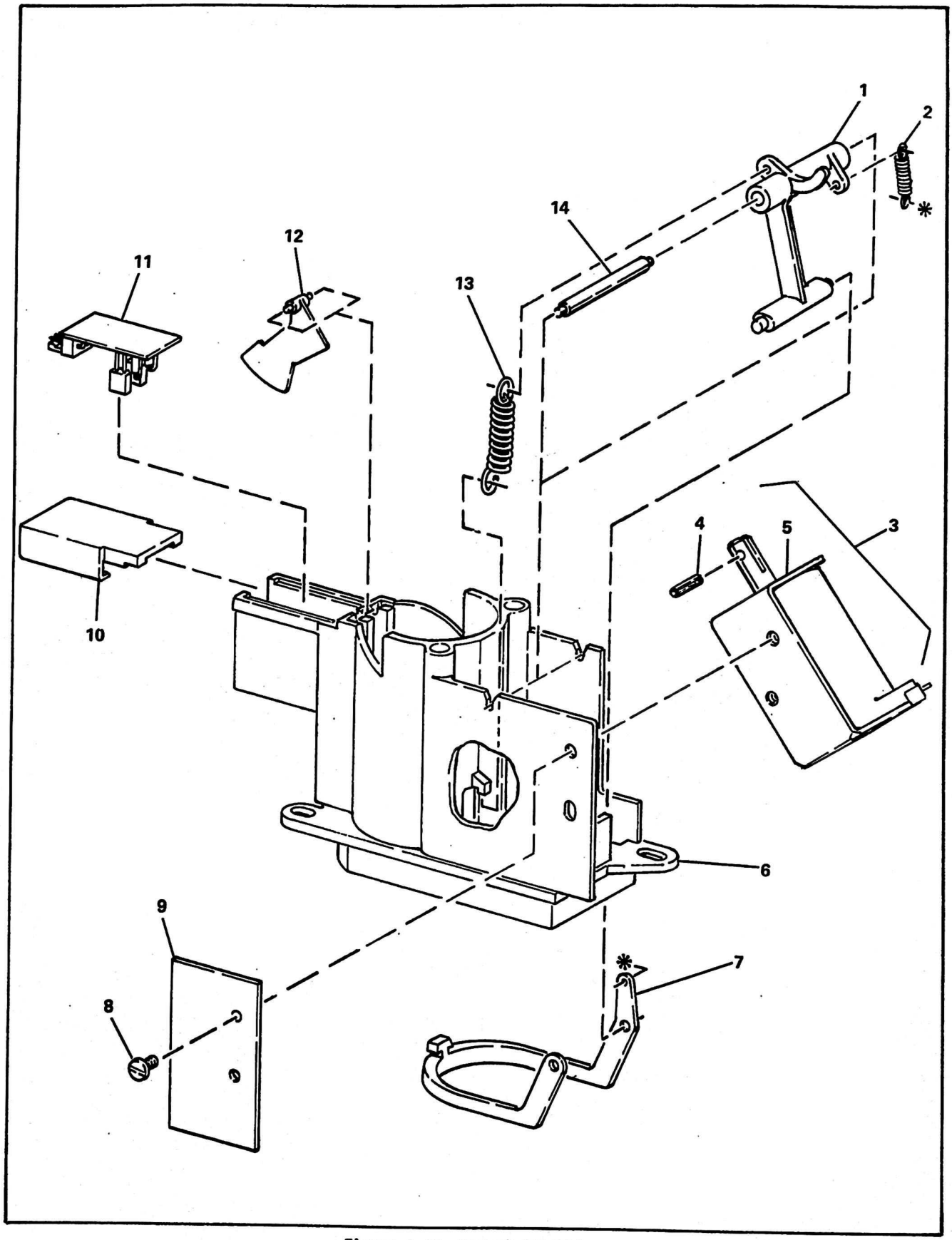


Figure 4-10. Payout Assembly

Index No.	Description	Part Number	No. Req.
	Payout Assembly (See Figure/Index 4-9/7 for next higher assembly)	5004540	Ref.
1	Arm, Ejector	5004545	1
2	Spring, Ejector	5004548	1
3	Solenoid Assembly, Payout	5004550	1
4	Roll Pin, .093 x 7/16	5220463	1
5	Solenoid, 24 VDC	5004551	1
6	Payout Base	5004541	1
7	Ejector	5004544	1
8	Screw, No.6-32 x 5/16 RHS w/Lockwasher	9900107	2
9	Plate, Solenoid Mount	5004549	1
10	Cover, Empty Sensor	5004543	1
11	Payout Assembly, PCB	5004555	1
12	Lever, Empty Sensor	5004542	1
13	Spring, Arm Ejector	5004547	1
14	Shaft, Ejector	5004546	1

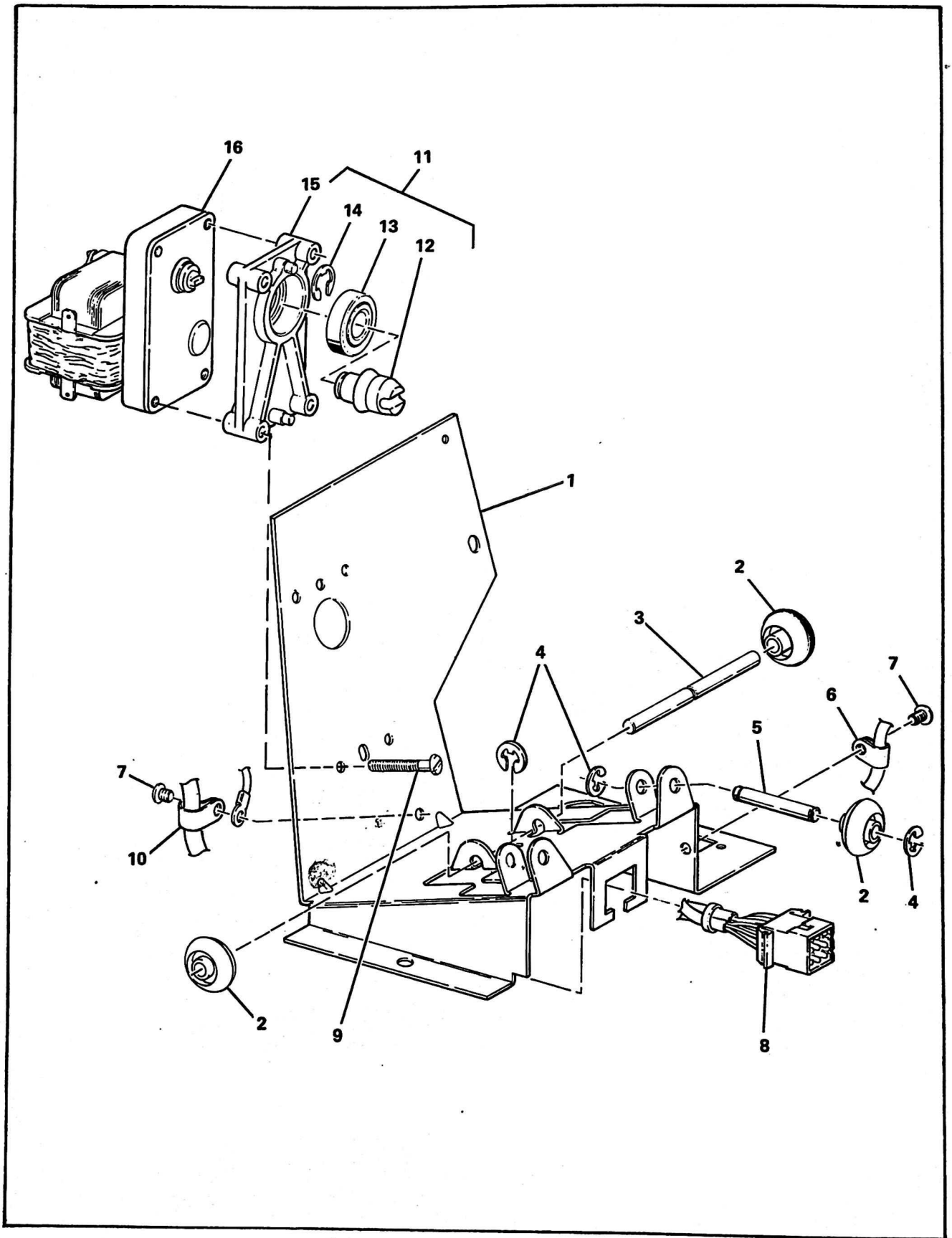


Figure 4-11. Payout Frame Assembly

Index No.	Description	Part Number	No. Req.
	Payout Frame Assembly (See Figure/Index 4-9/8 for next higher assembly)	5004511	Ref.
1	Payout Frame	5004512	1
2	Roller	5264287	4
3	Shaft, Drum Roller, Rear	5004514	1
4	Retaining Ring, Reinforced, "E" Type	9900425	5
5	Shaft, Drum Roller	5004513	2
6	Wire Clamp, 1/4	1211161	1
7	Screw, No.8-32 x 5/16 THS T/C	9900166	2
8	Harness, Payout	5004525	1
9	Screw, No.8-32 x 1.25 PHS	5004473	4
10	Wire Clamp, .370	2302227	1
11	Post Assembly, Bearing	5004516	1
12	Bearing Post	5273333	1
13	Bearing	5268435	1
14	Retaining Ring	5264421	1
15	Motor Mount	5004517	1
16	Motor, Drum Payout	5267963	1

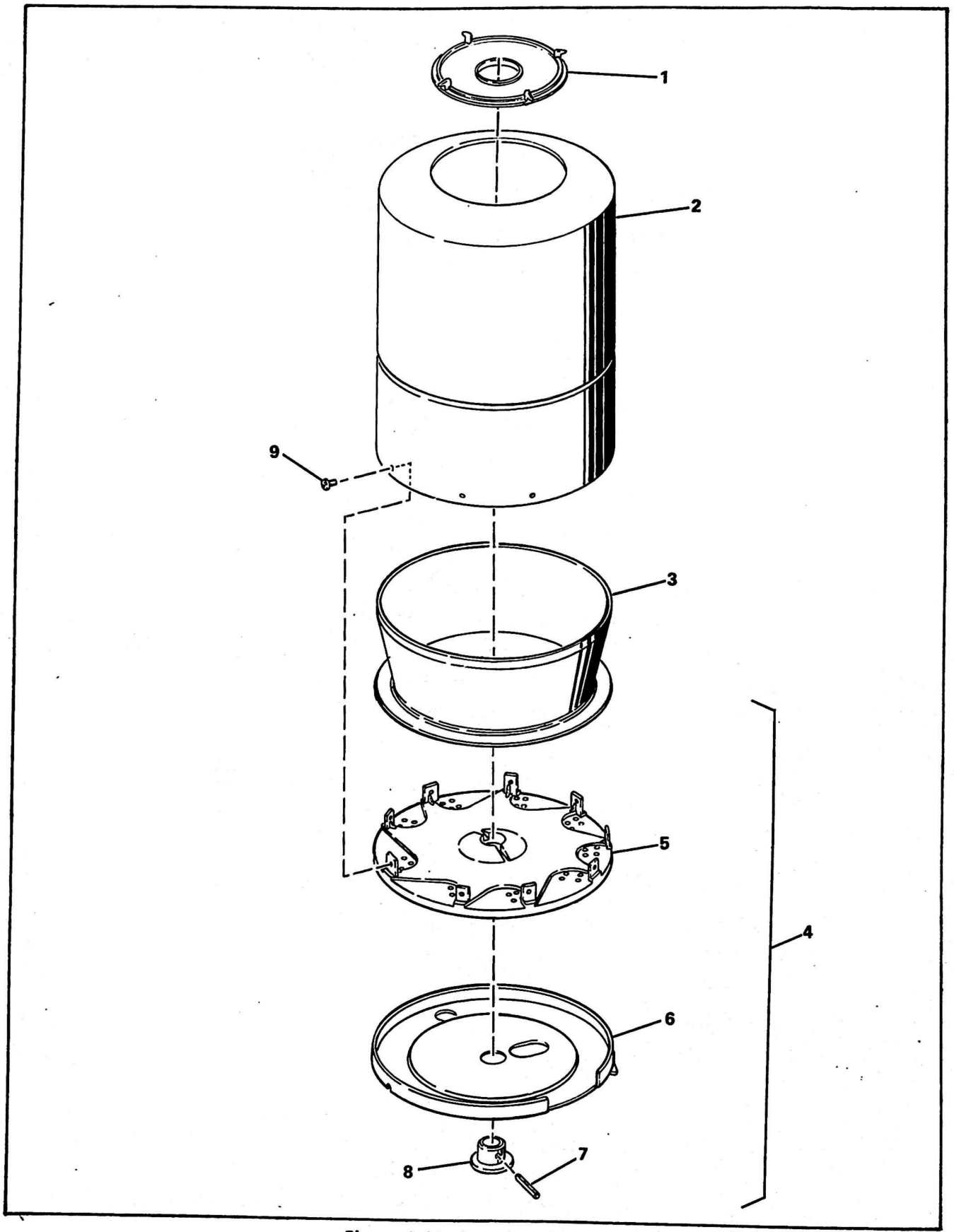


Figure 4-12. Drum Assembly

Index No.	Description	Part Number	No. Req.
	Drum Assembly (See Figure 4-9 for next higher assembly)	5004570	Ref
1	Drum Lid	5273664	1
2	Drum, Changetron	5004582	1
3	Venturi	5273413	1
4	Base Assembly, Drum	5004571	1
5	Base, Drum	5004572	1
6	Weld Assembly, Drum Cover	5004573	1
7	Roll Pin	5263921	1
8	Bushing, Drum	5004518	1
9	Screw, No.6-20 x 1/4 PPH T/F	5262197	9

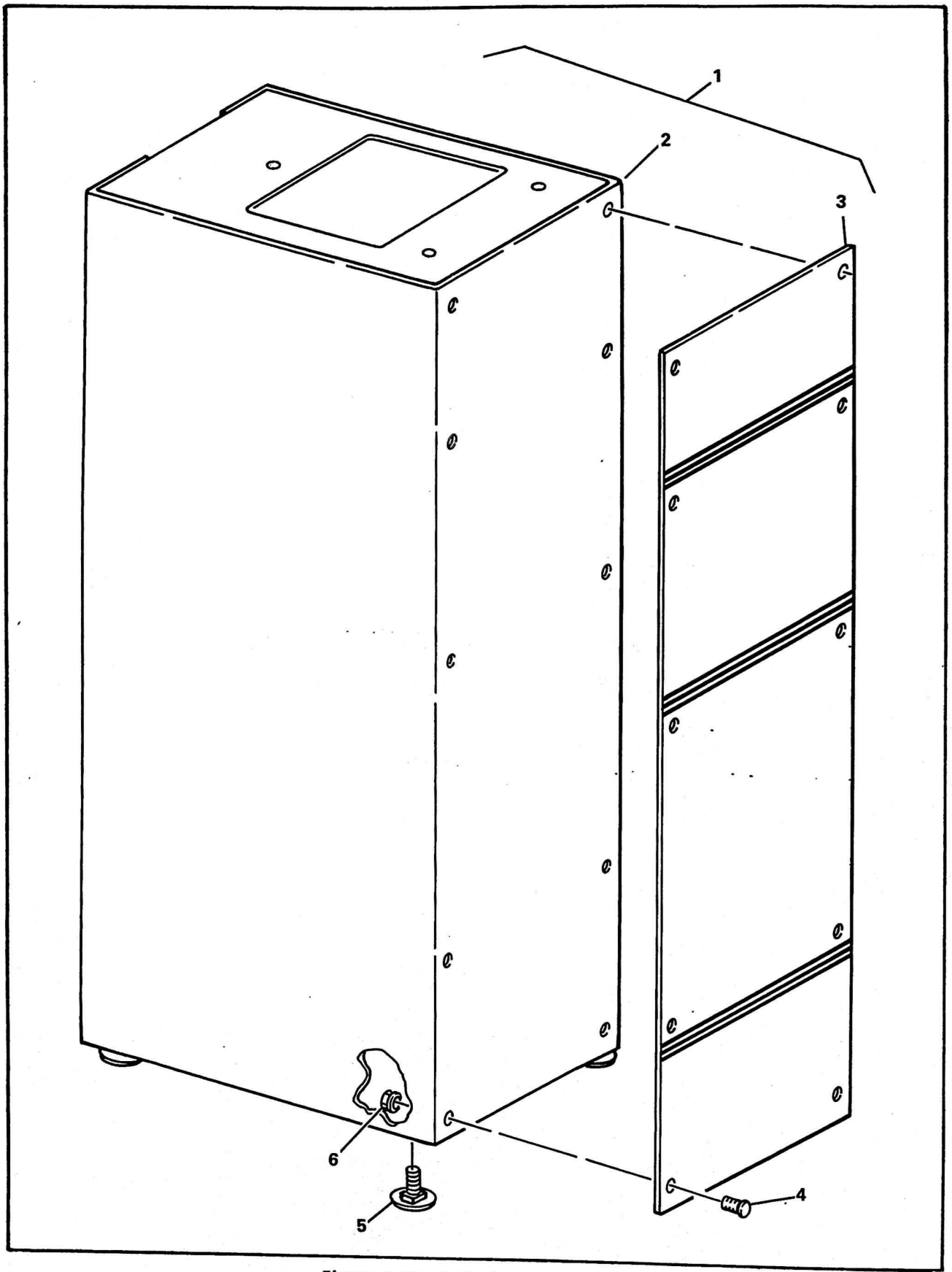


Figure 4-13. Cabinet Base Assembly

Index No.	Description	Part Number	No. Req.
	Base Assembly, Cabinet (See Figure/Index 4-11/4 for next higher assembly)	5003020	Ref.
1	Base Assembly	5003210	1
2	Weld Assembly, Cabinet	5003220	1
3	Panel, Base	5003230	1
4	Screw, Panel	5004472	10
5	Leveler Leg (included in parts package)	2221909	4
6	Lock Nut, No.6-32	5274168	10
	Parts Package,Base (not shown)	5003240	1

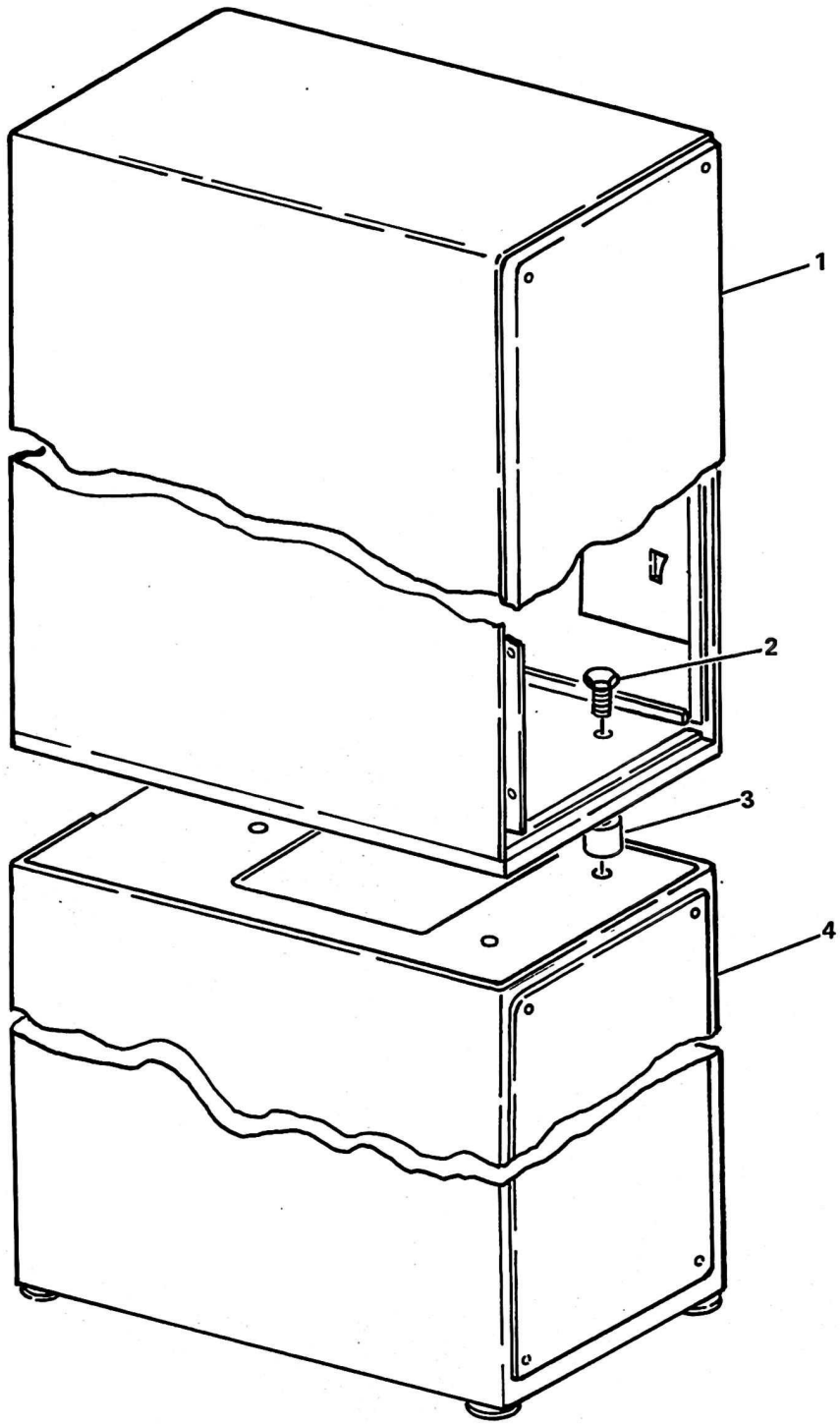


Figure 4-14. Cabinet and Cabinet Base Assembly

Index No.	Description	Part Number	No. Req.
1	Final Cabinet Assembly	5002120	1
2	Hex Head Bolt	5264915	3
3	Spacer	5264304	3
4	Cabinet Base Assembly	5003020	1

Notes -

REVISIONS			
ZONE	DESCRIPTION		
A	ECO NO. 5004-155	9-20-89	PS2

80270 CHANGETRON CONTROLLER

DRAWN	9-8-89	SCALE	
CHECKED			
ENGINEER			
MFG			
QUALITY			

TOLERANCES : 2 PLACE DECIMAL ± .02 UNLESS : 3 PLACE DECIMAL ± .005 ANGLES ± 1/2° EXCEPT OTHERWISE : PINNED ANGLES ± 1° SPECIFIED : CONCENTRICITY T.I.R. .010

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

NATIONAL VENDORS
A DIVISION OF UMC INDUSTRIES, INC.
ST. LOUIS, MO. 63116

EC2

8 24VCT — CR10 IN4001 — +12v — C1 1000µ 25v — C3 .01 — U14 — C4 .01 — +5v

1 24vac — +24VFW — CR1 IN4001 — U9 — C2 220 50v — R16 620Ω — Q1 2N3904 — +30v — C10 0.1 — CR4 IN972A

2

15 HOT

16 NEUT — 120vac

9

11 READY — V6 — C18 R22 68Ω 0.1 — K7

13 EMPTY — K6

14 STACKER — V5 — C17 R21 68Ω 0.1 — K5

17 DRUM B — V1 — C13 R17 68Ω 0.1 — K1

10 DRUM A — V2 — C14 R18 68Ω 0.1 — K2

12 DRUM C — V3 — C15 R19 68Ω 0.1 — K3

18 DRUM D — V4 — C16 R20 68Ω 0.1 — K4

3 — +24VFW

SOL D4 — CR5 — RP6-1

U8: +5v, +12v, C11 0.1

U7: +5v, C12 0.1

U11: +5v

U2

C20 XTAL — C21 27pF — 4MHZ

RP6-4

WR, RD, PSEN

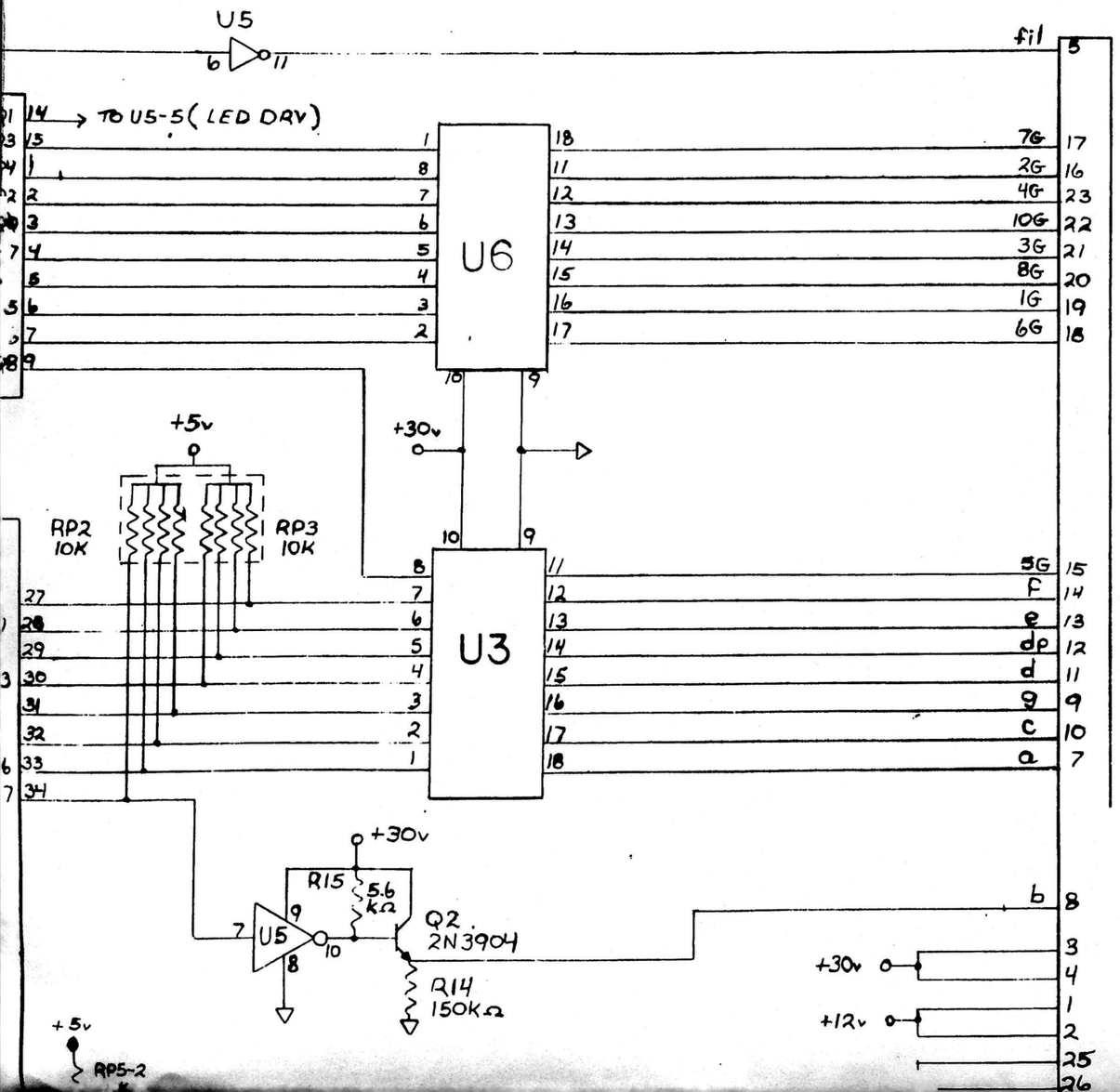
RP5-3

RP4 10KΩ — 0+5v

+5V

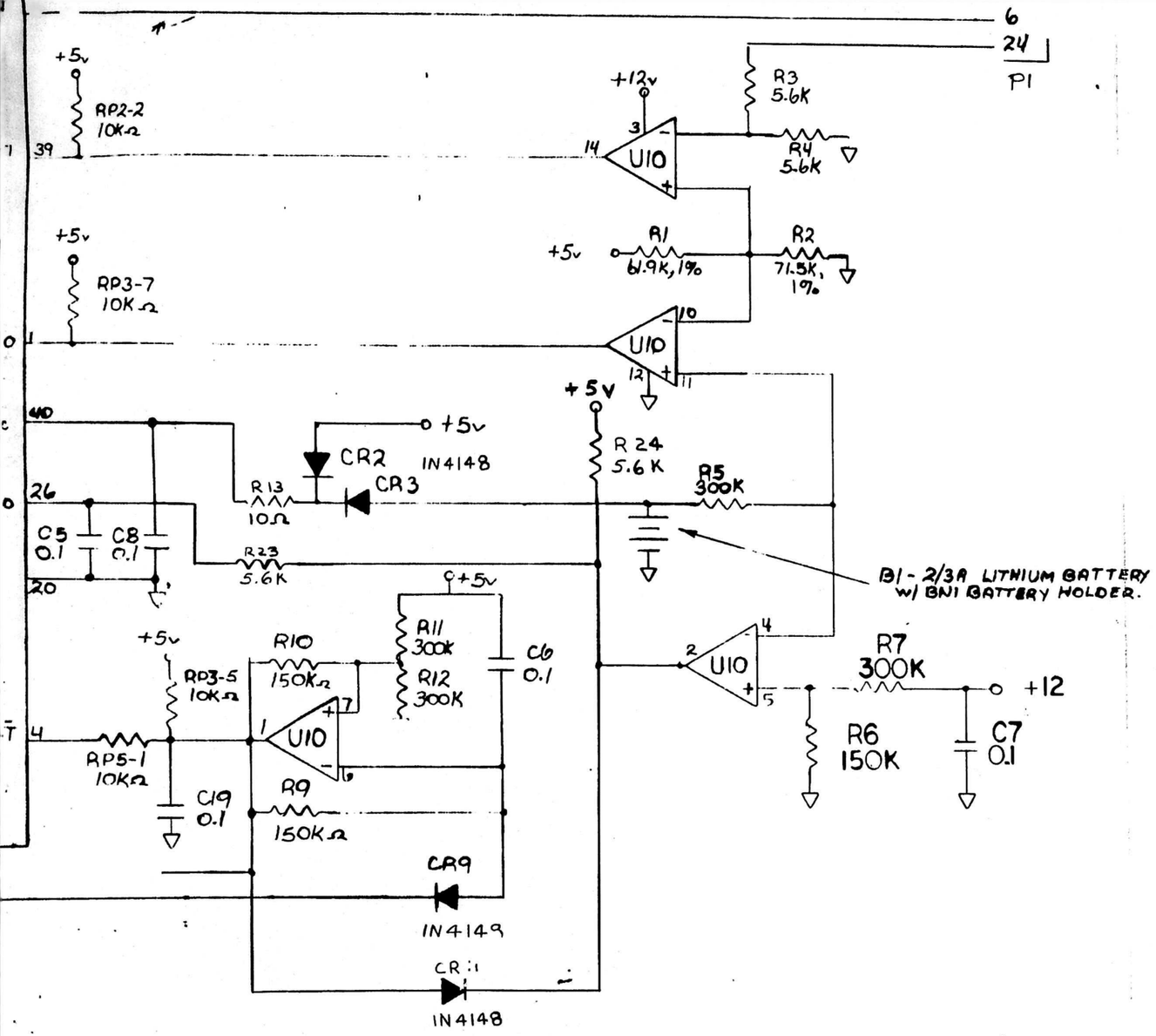
R25

UI



U1	80C39
U2	4028
U3	UDN6118-A2
U4	74HC244
U5	MC1413P
U6	UDN6118-A2
U7	74HC273
U8	MC1413P
U9	2W005
U10	LM339
U11	74HC273
U12	2732
U13	74HC373
U14	7805

CR6
SOL B 5
CR8
SOL A 6
CR7
SOL C 7
RP6-2 680Ω
Q4
RP6-3 680Ω
Q6
RP6-4 680Ω
Q5
EC-1
15
RP1 10K
+5v
20
10
7 INSTACKER
9 IN1000
11 IN500
13 IN100
14 INSBA
12 IN25
10 IN10
8 IN5
(0) 2
(1) 4
(1) 6
(1) 8
(1) 11
(1) 13
18
(1) 17
U4
E1
E2
7
19
(1)
18 DB7
16 DB6
14 DB5
12 DB4
9 DB3
7 DB2
5 DB1
3 DB0
RD
3 MTA
4 MTB
5 MTC
6 MTD
2 LEDDRV
1 +12v
4
3
2
1
12
U5
13
14
15
16
5
FROM U2-14
+5v
24
12
RP6-5 680Ω
18 CE
A11 21
A10 19
A9 22
A8 23
A7 1
A6 2
A5 3
A4 4
A3 5
A2 6
A1 7
A0 8
U1-24
RP3 10K
8 9 10
D23 24
P22 23
P21 22
P20 21
ALE 11
11
2 19 5 16 6 15 9 12
3 18 4 17 7 14 8 13
U13
VSS GND OE
20 10 1
+5v
C9 0.1
DB7 19
DB6 18
DB5 17
DB4 16
DB3 15
DB2 14
DB1 13
DB0 12
+5v
RP2 10K
35 P24
36 P25
37 P26
38 P27
RST
RD


6
24
P1
+5v
RP2-2
10KΩ
39
+12v
R3
5.6K
U10
14
3
R4
5.6K
+5v
RP3-7
10KΩ
+5v
R1
61.9K, 1%
R2
71.5K, 1%
U10
10
12
11
+5v
40
+5v
CR2
IN4148
CR3
R13
10Ω
26
C5
0.1
C8
0.1
R23
5.6K
20
+5v
R24
5.6K
R5
300K
B1 - 2/3A LITHIUM BATTERY
w/ BN1 BATTERY HOLDER.
+5v
R10
150KΩ
R11
300K
R12
300K
C6
0.1
RP3-5
10KΩ
4
RP5-1
10KΩ
U10
1
7
6
U10
2
4
5
R7
300K
+12
R6
150K
C7
0.1
C19
0.1
R9
150KΩ
CR9
IN4149
CR1
IN4148